Lab 5 VECTOR CARTOGRAPHIC MODELING

NEW SKILLS

- **Cartographic modeling using the vector format**

Having concluded that the Sacramento Kings really do live in the best location in California, the Los Angeles Lakers have decided to move to Central California as well. Voters in Yolo and Solano Counties have overwhelmingly approved a $750 million bond initiative to build a new arena for them in one of the two counties, where they will be known as the “Yolo-Solano Lakers.” Several celebrities have announced plans to move to Dixon so they can watch all the games from front row seats. You are employed by a consulting firm that has been hired to determine where to locate the new arena. The selection criteria that must be satisfied are:

1. The arena must be in Yolo or Solano County.
2. The arena must be within 3 kilometers of an urban area (but not inside any urban area).
3. The arena must be within 1 kilometer of an Interstate highway.

**GRASS**

1. In a new project, open your CalifGRASSData mapset (created in Lab 1) where you keep the basic data. Now add the shapefile urban.shp from the California subfolder of the folder QGISLab. Follow the same steps as you did in Problem 2 of Lab 1 to import the vector layer urban into the CalifGRASSData mapset as the GRASS layer urbanGR. You can remove the urban shapefile layer.

2. It is convenient to carry out this exercise in a Lambert projection because the map units are in meters. Open the CalifLambData mapset in the CalifLamb location. Using the same procedure as you did in Question 1 of Lab 2, use v.proj to create vector layers interstateLamb and urbanLamb in this mapset. If you have given your folders the same names as I have then your path to the location is C: \QGISLab, your location is CalifGRASS, and your mapset is CalifGRASSData.

3. Create a new mapset called Lab5 in the CalifLamb location. Make sure that your interstateLamb, urbanLamb, and countiesLamb layers are loaded in. First, we will create a Yolo-Solano County layer. Select Yolo and Solano Counties from the countiesLamb layer (do you use NAME = ‘Yolo’ OR NAME = ‘Solano’ or NAME = ‘Yolo’ AND NAME = ‘Solano’?). Next, use the GRASS tool “v.extract – Extract elected features” to create a vector layer in the Lab5 mapset consisting of only Yolo and Solano counties. Call it yolosolano.

4. First we will create a 1 km buffer of the Interstate highways. Use the GRASS tool v.buffer to create a 1000m buffer of “interstateLamb.” Name it interst1km.

3. It will prove to be quicker in the computer to work with only those parts of the urbanLamb vector layer that are within the yolosolano layer. Use the GRASS tool “v.overlay – Vector intersection” to intersect yolosolano with urbanLamb. Name the output layer urbanYS.

4. The specifications call for the arena to be located within a 3 km distance of an urban area, but not within an urban area itself. Therefore we will have to create a 3km buffer. Create the 3km (3000m) buffer around urbanYS, and call layer urban3km. Next, we will do a vector subtraction
of urbanYS from urban3km. Use the GRASS tool “v.overlay – Vector subtraction” to subtract urbanYS from urban3km. Name the result urbanoutside and open it.

5. Next intersect urbanoutside with interstate1km using “v.overlay – Vector intersection” to create urbaninterstate and open this.

6. We are almost done! Some of the locations in urbaninterstate are outside Yolo and Solano Counties. Intersect urbaninterstate with yolosolano to create arenaLocations. Open this. Together with the maps of Yolo and Solano Counties, the urban areas, and the interstates, your map should look like that below.

**QGIS**

Use Plugins -> Manage plugins to make sure fTools is fetched and checked.

7. First we need to create the shapefiles to work with. Start a new project and open the CalifLamb mapset. Add the vector layers countiesLamb, interstateLamb, and urbanLamb (if you did not do Problem 1 of this lab, do it now). Then use the GRASS tool v.out.ogr to export these into a new folder you create called Lab5. Call them CountiesLamb, InterstLamb, and UrbanLamb

8. Start a new project and add the three shapefiles you created in Exercise 7. Open the CountiesLamb attribute table and use Advanced search to select Yolo and Solano Counties (do you use AND or OR?). After selecting the 2 counties, right-click the “CountiesLamb” layer and select “Save selection as…” Name the output layer YoloSolano and it to the map.

9. Next we will create the buffer layers. Use Vector -> Geoprocessing Tools -> Buffer(s) to create a 1000 m (i.e., 1 km) buffer of intrstLamb.shp. Call it intrst1km.shp. Add it to the map. Now repeat the process to create a 3 km buffer of urbanLamb.shp called urban3km.shp.

10. Open Vector -> Geoprocessing Tools -> Clip. Select intrst1km as the Input layer and YoloSolano as the Clip layer. Name the output layer interstYS and add it to the map. Remove intrstLamb. Now repeat the clip process with urban3km.shp to create urbanYS.shp.

11. Intersect urranYS.shp with interstYS.shp to produce urbsites.shp. Finally, take the difference between urbsites.shp and urbanLamb.shp to produce stadiumsites.shp. Remove all of the files but this one and yolosolano.shp. Your map should look like this.