GEOG 3231/5231 Intro GIS

**Raster analysis in-class**

***Ranked site selection, Belmont CA***

**Objective**: find suitable sites for a summer cabin. You want it to be near your home & work in Belmont, California. Within 10 km would be optimal, but 15 km is suitable, farther away is unacceptable. You want it to be at a higher elevation so it is cooler. Below 250m is unacceptable, 250m-300m would be suitable, but over 300m would be optimal. And you want the land cover type to be a grassland, but evergreen forest would be suitable; all other land cover types are unacceptable.

***Rank the area around Belmont based on the criteria above to find the most optimal locations.***

***Classify your data using a tiered 3-rank system so the highest values have the highest rank:***

* ***100 = optimal, 10 = suitable, 1 = unacceptable***

**TAKE NOTES! You’ll need them for the assignment & can refer to them during the final exam.**

As with vector analysis there is a basic order to the analysis steps:

1. Spatial reference *to process analysis in meters all data must have appropriate UTM zone projection!* 
   1. Set data frame coordinate system & Export layers
2. Delineate area of potential analysis (Create mask)
3. Set geoprocessing environments
4. Prepare selection criteria layers
   1. Euclidean Distance
   2. Simplify the data (Reclassify)
5. Spatial overlay (Map algebra)
6. Simplify the final result (Reclassify)

**Pre-analysis data processing (Steps 1-3):**

* Examine the data: What is the native projection for each layer? What projection would be most appropriate for this project?
* Set the data frame to the appropriate coordinate system
* Create new raster data by exporting (use data frame coord. system)
  + Set Extent | Spatial Reference | Square, Cell Size 30 | Format GRID | Rename
* Select & export Belmont from the places layer (use data frame coord. system)
* Visit USGS website to determine land cover classes: <http://landcover.usgs.gov/classes.php>
  + Grassland code = Evergreen forest = Water =
* Make a watermask with the reclassify tool to delineate area of analysis (can’t put a cabin in the water)
* Set Geoprocessing Environments to define analysis settings
  + Workspace
  + Output Coordinates
  + Processing Extent
  + Raster Analysis
    - Cell Size
    - Mask

**Raster data analysis (Steps 4-6):**

* Create a distance raster using Belmont as the starting point (input feature)
  1. What units are the output cell values?
* Reclassify to rank the distance grid based on preferences 🡪 Reclassify tool

*\*Note: after each reclass, you can turn off all layers but the input raster & the reclassed layer and use the identify tool set to “Visible layers” to double check the output. Does the reclassified layer make sense?*

* Reclassify elevation based on preferences 🡪 Reclassify tool
* Reclassify landcover based on preferences 🡪 Reclassify tool
* Create a composite raster by adding all reclassified rasters 🡪 Map Algebra, Raster Calculator
  1. What values does the composite raster have?
* Reclassify the composite raster to have only three ranks:
  1. Optimal =
  2. Suitable =
  3. Unacceptable =
* Copy the attribute table from this final raster layer to Excel, edit the table, copy & paste to map layout
  1. Edit row labels to match selection ranks (optimal, suitable, unacceptable)
  2. Create fields for area in square meters, and area in acres
  3. Calculate each
* Label Belmont & zoom to “bull’s eye” (2nd rank, “acceptable” sites)
  1. Use a Halo to highlight the text label
  2. Use data zoom to fill data frame with view of only potential locations
* Add the USA layer & export California to create an inset reference map with an Extent Indicator showing the Belmont study area.
  1. What spatial reference is appropriate for this data frame?

***\*\*\*You do not need to create a finished map for this project\*\*\****