GEOG 3231/5231 Intro GIS

**Vector analysis in-class**

There will be **many steps** to this project, which we will work through together to make a preliminary selection of camping site locations in Beltrami County that meet specific criteria.

The out-of-class assignment will use the same data & many of the same steps, but different site selection criteria and you will be on your own. **Follow along closely & take good notes! You’ll want them for the out of class project & the final exam.** For extra practice, download a second copy of the prjct3\_vector data to work though the out of class assignment.

**Data sources:**

***Beltrami County Natural Resource Management (NRM)***: forest shapefile, bc\_south.shp delineating the extent of managed lands (south of Upper Red Lake, this will serve as our study area), Excel table with forest inventory data, and MN DNR Forestry CSA Guide to interpret the data in this table.

***MN DNR***: roads, county boundaries, water (hydro), MN state boundary

***University of MN (UMN)***: soils data

***MNGeo****:* background imagery accessed via the Composite Image Service website <http://www.mngeo.state.mn.us/chouse/wms/composite_image.html>

**Site selection criteria:**

Use vector analysis to identify areas that meet the following criteria:

* Red pine (Norway) forest types
* At least 100 meters from a road
* 500 meters or less from water

**Data processing & analysis:**

Before you begin analysis, examine the data and determine what preliminary processing is necessary.

\***All data must have correct & uniform spatial reference** to enable geoprocessing & analysis operations.

1. Start ArcMap and examine your data layers in the ArcCatalog tree to determine spatial reference.

1. Which coordinate system would be most appropriate for this mapping project? Why?
2. Set geoprocessing environments to delimit analysis settings & spatial reference.
3. Does the county forest layer contain the attribute (forest type, specifically red pine) we want?
4. The forest data needed for our analysis is contained in the forest inventory Excel table
   1. Edit the table & join to the forest layer
   2. Export the joined shapefile to make the join permanent
5. Next, we want to make the layers we are working with more manageable and create necessary buffers
   1. Clip lakes & roads to the southern Beltrami study area boundary
   2. Buffer roads to 100 meters, dissolve all
   3. Buffer lakes 500 meters, dissolve all
   4. Examine the CSA manual to identify the code for red pine and then query attributes of the forest data layer to select & export all red pine records
6. Now that we have refined each of the individual input layers, we can use Overlay operations to identify the places that meet all three criteria
   1. Intersect lake\_buff, red pine forest subset (the criteria we want in close proximity)
   2. Erase roads\_buff from the previous intersect layer (remove what we don’t want to be near)
   3. How many locations did the analysis select?
7. Arrange your layers & set the symbology for each to create your finished map.
   1. Turn on roads, select appropriate symbology
   2. Make the lakes 60% transparent
   3. Set symbology for selected pine camp sites to a bright color with 2 pt line
   4. Bring the composite air photo into your map layout
   5. In the Data Frame tab of your data frame properties, set “Clip to shape”
      1. Select the study area boundary as the clip feature
8. Insert a new data frame to create an inset reference map with the MN state and county boundary layers
   1. Use Extent Indicators to create a dynamic outline of the mapped area in the main data frame.
9. Find an image on the internet that makes sense with the theme of your map and add it to your layout.