Lab 3 Part 1 –Base Layers

REM 407 – GIS Applications in Fire Ecology and Management

Objectives

- Organize and explore new data
- Download LANDFIRE data

Your Mission: You have just been hired as the new assistant to the GIS specialist on the Payette National Forest. They have been planning a large-scale multi-discipline project since 2006 and have started to implement some of the treatments. Up to this point, the potential vegetation groups (PVG) have been used to assess the condition of the fuels and determine if treatments will meet the objectives across disciplines (wildlife, fish, forest, human). PVGs, however, cannot estimate potential fire behavior and fire effects. As part of a justification and validation of these fuel treatments, you have been asked to use LANDFIRE data to model potential fire behavior across the landscape under different treatment scenarios. The first step in the process is to calibrate the current LANDFIRE layers, so they reflect the actual conditions on the ground.

As you complete the reading, consider the following question.

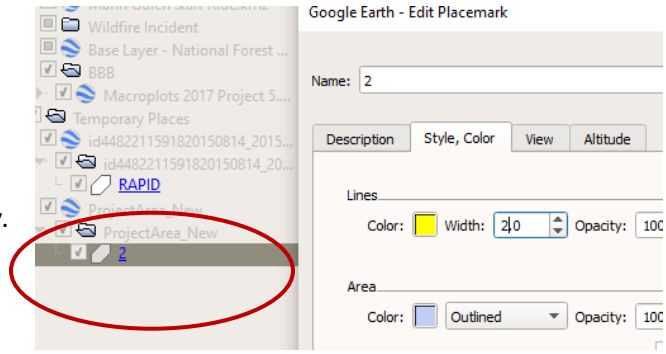
<u>Reflection question:</u> Summarize the overall motivation and strategy for the Brundage Bear Basin Project. What do you think about the proposed plan?

1. **Download project data**
   As much as possible, I will direct you to data sources rather than providing the data to you so that you can find your own data for future projects in and outside of this class.

   a. Brundage Bear Basin project area – download from Bblearn. Unzip and save to your class folder which preferably will be C:/407/Lesson_3

   Get familiar with the area using Google Earth.

   i. Open Google Earth
   ii. Select **File>>Open**
   iii. Navigate to the *Lesson_3>>BBB_data* folder and select the **BBB_project_boundary.**
   iv. The file comes up as *ProjectArea_New*.
   v. Expand the two folders for *ProjectArea_New*, right-click on the polygon and select **Properties**.



   vi. In the *Style, Color* tab under *Lines* change the color and width and under *Area* change to **Outlined.** Click **OK**
   vii. Explore the area and answer the following questions. If you are unfamiliar with Google Earth – watch this short video to see some of the basic functions. https://www.youtube.com/watch?v=fa7c4SVzo0I. Becoming familiar with the following features will help you in future labs.
      a. Roads

b. Topography
c. Urban Interface
d. Recreation
e. Water systems
f. Vegetation cover

Question 1: Where is the BBB project in Idaho?

Question 2: Describe some notable features around the project site that might influence its implementation.

b. Payette National Forest Perimeter
    i. Do a web search for "National Forest Geodatabase."
    ii. Select **USDA Forest Service FS Geodata Clearinghouse**
    iii. Look through the many data layers available
    iv. Download the **Ranger District Boundaries – ESRI geodatabase**
    v. Place unzipped contents in your Lesson_3 folder.
c. State of Idaho – used in the final map to provide context
    i. Do a web search for "United States Shapefile."
    ii. Select **Cartographic Boundary Shapefiles**
    iii. Select **State**
    iv. Click **cb_2016_us_state_20m.zip** to download.
    v. Place unzipped contents in your Lesson_3 folder.
d. Mountain peaks – used to validate LANDFIRE elevation layer
    i. Do a web search for "USA Mountain Peaks ArcGIS."
    ii. Select **USA Mountain Peaks – ArcGIS**
    iii. Click **Download** and then save to your Lesson_3 folder
e. 1:24,000 Meter quads – for the base layer and visual reference
    i. Go to Inside.uidaho.edu
    ii. *Apps* >>**Topographic Maps**
    iii. Zoom into the McCall area
    iv. In the upper-right under *Choose Layer* change to **DRG 24k Idaho**
    v. Download the nine topo maps around the BBB area
        a. Brundage Mountain, Granite Lake, Box Lake,
        b. Meadows, McCall, Fitsum summit
        c. No Business mountain, Lake fork, Paddy flat
    vi. Place unzipped data into C:/407/Lesson_3/Topo.

f. Rapid fire progression – used for output comparison of LANDFIRE
    i. Go to https://ftp.nifc.gov/ - *If the site is not available, contact Heather Heward (hheward@uidaho.edu), and the data will be made available to you.*
    ii. Select Incident Specific Data >> great_basin>> 2015_incidents>> 2015_rapid>>GIS>>Data
    iii. For the following dates, click on the folder and download the zip file containing **per_pol.** Place unzipped data into C:/407/Lesson_3/Rapid
        a. 20150816
        b. 20150817 – select the 2147 perimeter zip file

c. 20150819 – Note - this zip and shapefile were mislabeled as 0818, this is actually from 0819.
d. 20150820
e. 20150821 – select the 0700 perimeter zip file

g. Rapid fire MTBS – used for output comparison of LANDFIRE
   i. Go to https://www.mtbs.gov/
   ii. Select **Get Data via Direct Download**
   iii. Select **Idaho** and *only* 2015 as the date range
   iv. Sort by *fire name* and check the **Rapid** fire
   v. Click **Download 1 file**
   vi. MTBS data come zipped and then additionally compressed as a tar.gz. First, unzip the *Data* file. The method of extraction may depend on your computer. If possible, download 7-zip to access these files. If you are not able to unpack the data, please contact Heather Heward, and she will work to make the data available for you.
      a. Extract using 7-zip - In the *fire_level_tar_files* right-click on the .tar.gz file and select *7-zip*>> **Extract files here**.
      b. Open the .tar folder and select 7-zip>>**Extract files,** save to *Lesson_3>>Rapid.*

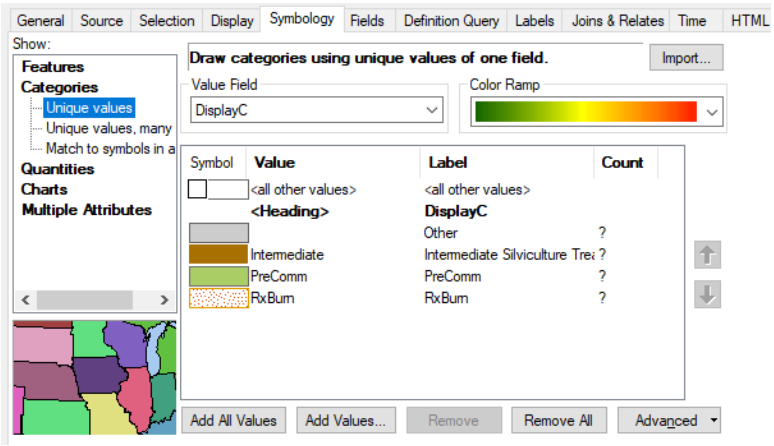
2. Organize and explore data from the Brundage Bear Basin project

a. Creating a Geodatabase – This project was started before the widespread use of Geodatabases. It is common in long-term projects for data to be scattered and in a variety of locations and formats which can make starting on new projects very challenging. With the increased use of the geodatabase – less time will be spent tracking down and formatting base information.
   i. Open Arc Catalog
   ii. Navigate to *Lesson_3* – right-click and select *New>>File Geodatabase* and name it **BBB_project**
   iii. Open the BBB_data folder and right-click on *BBB_treatments*. Select *Exports>>To Geodatabase(single)*.
      a. Output location = BBB_project.gdb – when selecting the location you will need to click on the .gbd where you want it to be saved and select **Add**.
      b. Output feature class = BBB_treatments
      c. Click **OK**
   iv. Repeat this process with BBB_project_boundary.shp and *BBB_macroplots.shp*.

b. Organize data in ArcMap

Open a new ArcMap project and save it to your Lesson_3 folder. Add the following layers.
- BBB_project_boundary- make it hollow and change outline color and width

- BBB_treatments - right-click and select **Properties.** On *Symbology* tab select **Categories**. Change *Value Field* to **DisplayC** and click **Add All Values.** Uncheck *<all other values>,* change the first-row grey, and change the others to match the map on page 2-11 of the Environmental Assessment. Click **OK**. In the Table of Contents next to the grey box, label it **Other** and change to *Intermediate* add *Silviculture Treatment*.
- BBB_macroplots



- RangerDistrict – Open the attributes table and select the five rows for the **Payette National Forest**. Right-click on the RangerDistrict layer and click *Selection >>* **Create Layer From Selected Features**. Name the new layer Payette National Forest. Change the symbology to hollow with a green solid line
- cb_2016_us_state_20m – Repeat the above process to make a layer for just the state of Idaho.
- Topography maps - Right-click on **Layers** in the ArcMap table of contents and select **New Group Layer**. Name the group **Topo**. Add the nine topo maps. Change the symbology of class 1 to *No color* for each topo layer to remove the white border of the maps.
- Rapid fire progression – Create a **New Group Layer**. Name the group **Rapid_progression.** Change 0818 to 0819.
- Mountain Peaks – If the .lpk file does not show in the *Add Data* window then open ArcCatalog, navigate to the lesson 3 folder and drag in **USA_Mountain_Peaks**

Save your Arc Project

3. Acquiring LANDFIRE data

Use the direction in the How-to: Download LANDFIRE data.pdf available on Bblearn for directions to acquire data for this area. The intent of referring you to more general directions in a separate document is that you will be better able to use the processes for a variety of applications in and outside of this class.

I recommend downloading from landfire.gov to avoid recent unknown errors. The LFDAT toolbar does have several other useful tools and should be downloaded if possible. See the LFDAT User's Guide for installation instructions; download the tool from https://www.landfire.gov/download_lfdat.php

Extent – Select an area that covers both the Macroplot points, BBB project, and the Rapid fire. If downloading from landfire.gov, you will need to enter the general location for your download in decimal degrees. To do this, change the display in ArcMap. *View>>Data Frame Properties >>General tab* under *Display* select **Decimal Degrees.** Record the upper and lower latitude (positive number) and the upper and lower longitude (negative number).

Data – download the most current layers (LF2014)

Vegetation

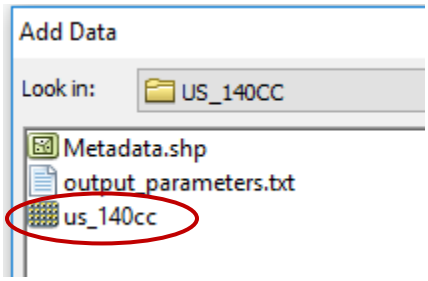
- ☐ Existing Vegetation Type (EVT)

Fuels

- ☐ 13 Fire Behavior Fuel Model - *Note – do not download the LCP file*
- ☐ 40 Fire Behavior Fuel Model
- ☐ Canopy Cover
- ☐ Canopy Height
- ☐ Crown Base Height
- ☐ Crown Bulk Density

Topography

- ☐ Elevation
- ☐ Slope
- ☐ Aspect



Download each of the zip files and unzip into a folder for your LANDFIRE data.
Use the Add LANDFIRE Data option in LFDAT to add the LANDFIRE data with the proper symbology. You only need to add the GRID layer in the LANDFIRE data folders.

Organize layers in a *New Group Layer* folder for **LANDFIRE**.

Question 3: Take a screen capture of your Arc project including, expanded table of contents, EVT layer, Rapid progression, BBB project boundary, and BBB project treatments.