LANDFIRE Data Access Tool 2.7 Tutorial

Introduction

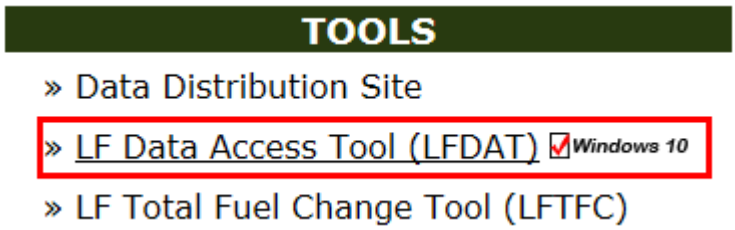
The LANDFIRE Data Access Tool, or LFDAT, is an ArcGIS toolbar that facilitates LANDFIRE (LF) data downloads and analysis in ArcMap. You can access LF data in several ways, which are outlined under Data Access at: https://www.landfire.gov/data_overviews.php. One of the methods to access LF data is using LFDAT.

This tutorial steps you through how to obtain, install, and incorporate LF data into an ArcMap project. For the purpose of the exercises in this document, the LF Tutorial material was downloaded and installed in the **C:** drive previously.

For further explanation of LFDAT capabilities, refer to the LFDAT User Guide.

Note: If you use Internet Explorer 7, refer to appendix A.

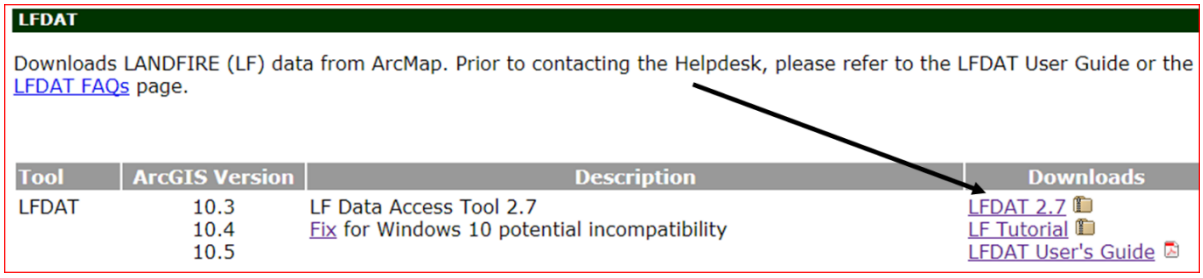
1. Where/How to Install the LFDAT.
   - Navigate to https://www.landfire.gov/index.php. Click on LF Data Access Tool (LFDAT) under the Tools section in the right hand bottom corner.



   - Read about LFDAT. What three data types does LFDAT generate?
     - Answer: ESRI ArcGRID, ERDAS IMAGINE, or GeoTiff formats.
2. Next, click on the Download LFDAT button on that page.

   - Download the LFDAT zip file compatible with the ArcGIS version you have installed, and unzip it to a temporary location. For this exercise, we will use the most recent version, LFDAT 2.7, which works in ArcGIS versions 10.3.x, 10.4.x, and 10.5.x.

LANDFIRE Data Access Tool 2.7 Tutorial



LFDAT

Downloads LANDFIRE (LF) data from ArcMap. Prior to contacting the Helpdesk, please refer to the LFDAT User Guide or the LFDAT FAQs page.

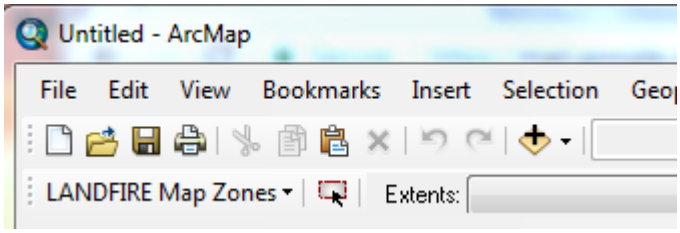
Tool	ArcGIS Version	Description	Downloads
LFDAT	10.3 10.4 10.5	LF Data Access Tool 2.7 Fix for Windows 10 potential incompatibility	LFDAT 2.7 LF Tutorial LFDAT User's Guide

- Skim the LANDFIRE.chm file. It contains useful information regarding subsequent installs and updates. Close the files.

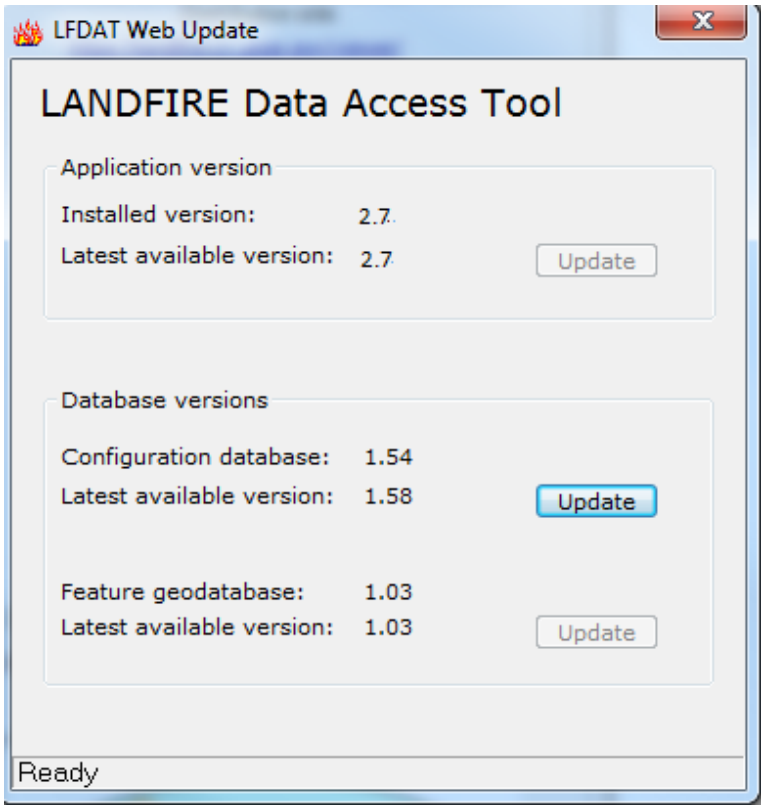
3. To install LFDAT, double-click the setup.exe file listed in WinZip. If a Winzip Caution window appears, click Yes. The Setup Wizard will open and then click Next. Click Finish when it is complete.

   - Check that the LFDAT installed properly. Start ArcMap with A new empty map. Generally, the toolbar will appear automatically in the ArcMap interface, but occasionally you need to activate the toolbar by going to View > Toolbars > LANDFIRE Data Access Tool.

   - Optional: drag and drop the toolbar to dock it at a convenient location near the top of your *ArcMap* window:

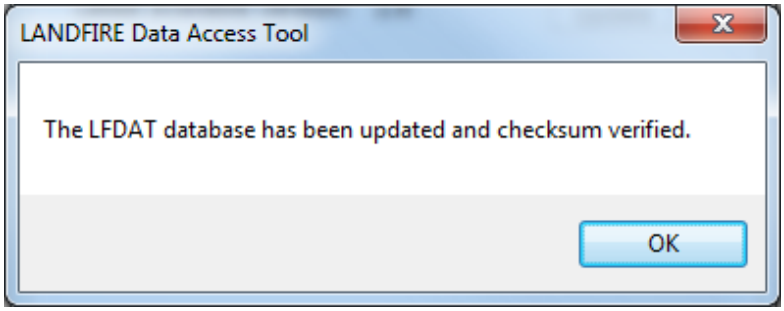


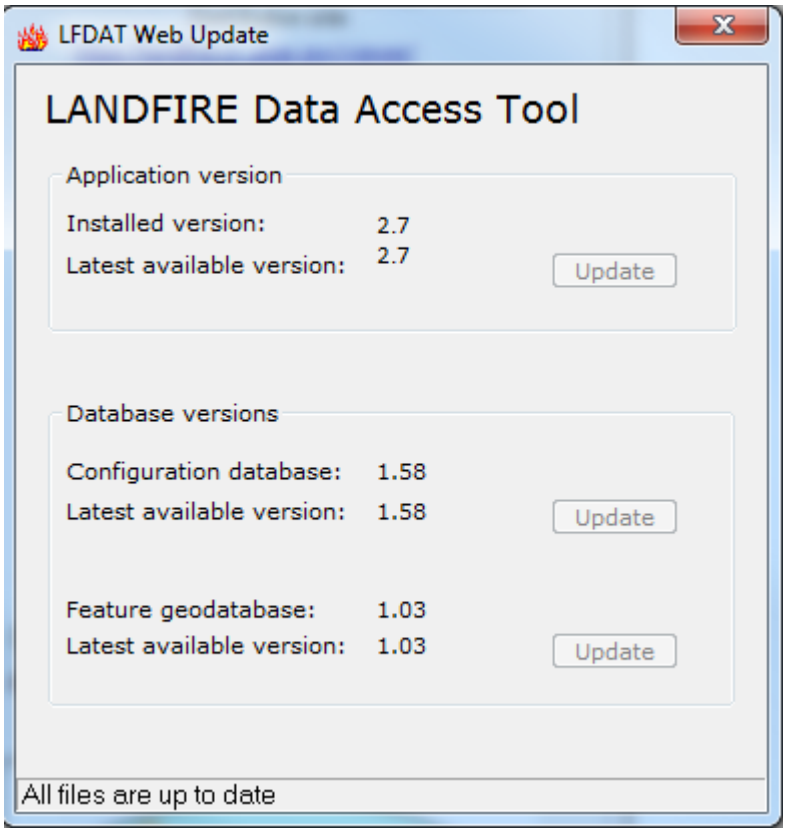
4. Select the *About* icon and click on the *Check for updates* button. A window similar to the following appears:



- This utility checks that the most current version of the LFDAT is installed, and ensures the databases that accompany LFDAT are current. If there is an updated version, the Update button will be enabled. While databases updates are not frequent, it is highly recommended that you run the Check for Updates regularly to keep the Configuration database current. You need only to click on the Update button to update automatically.

- If the Configuration database Update button is enabled, click to update. A windows message will appear confirming the configuration database was updated. Click OK on the windows message and the configuration database will show the latest version installed.





- You are now ready to download and process LF data using LFDAT.

II. Using the LANDFIRE Data Access Tool

1. Scroll over each of the LFDAT icons. A brief description for each button is listed in the table below:

Table 1: LFDAT Icons and Descriptions

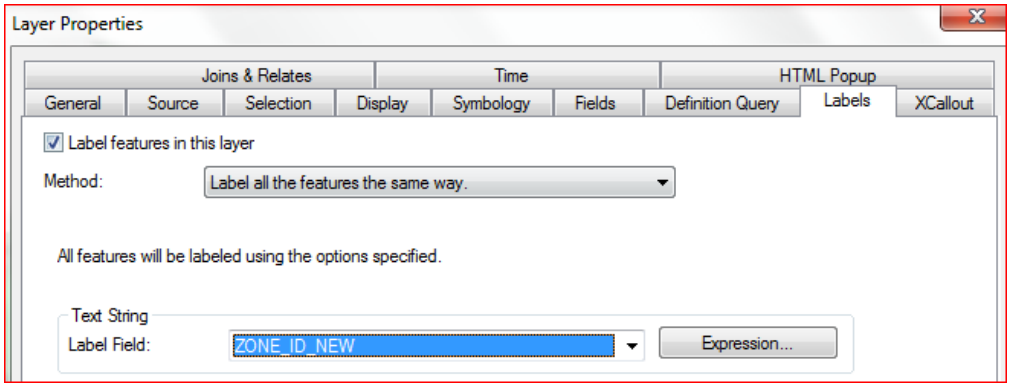
Icon	Description
LANDFIRE Map Zones	Adds layer depicting LF data availability by map zone.
	Used to drag an extent box in ArcMap.
Extents:	Drop-down menu of previously saved extent rectangles for future downloads.
	Saves an extent rectangle by entering coordinates.
	Smart Assembler processes downloaded LF data zip files. The Smart Assembler requires input and output folders. Output is in ESRI Grid, ERDAS IMAGINE, or GeoTiff formats.
	Add data button addresses colormap issues with LF data in ArcMap.
	Provides four raster utilities: Reproject Raster, build LCP File, and attach DBF to ArcGrid VAT and LCP to ArcGrids.
	About form with web update feature and User Guide.

2. In this section, you will download data based on a shapefile-defined extent and be introduced to the LFDAT Saved Extent functionality.

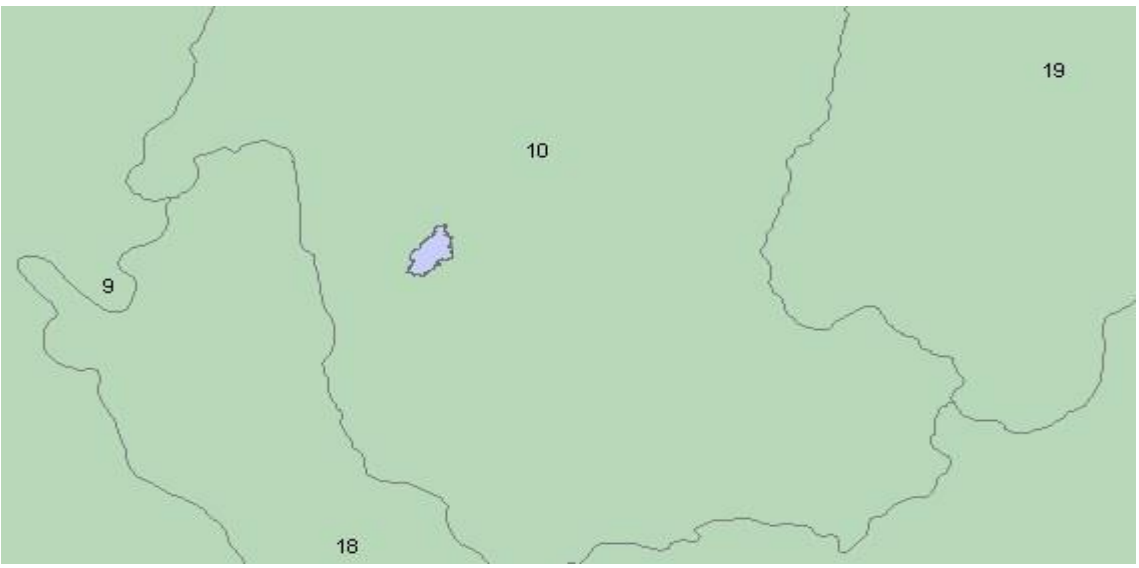
   - With ArcMap open, add perimeter.shp file from the C:\LFDAT_tutorial folder.

   - Next, click on the LANDFIRE Map Zones drop-down arrow and choose Add CONUS Layer.

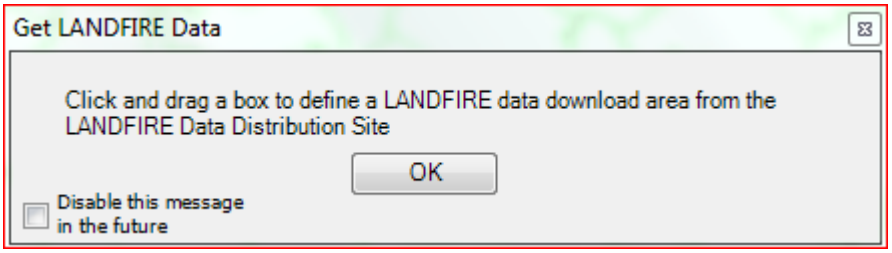
   - Drag perimeter.shp to the top of the Table of Contents. You may need to turn on labels on the CONUS Map Zones. Right-click on CONUS Map Zones, select Properties, open the Labels tab. Check the Label features in this layer box. Select ZONE_ID_New for Label Field, click on OK to apply and see the labels.



3. The shapefile is located towards the bottom of Zone 10. Using your tool, zoom out a few times until you can see zones adjacent to zone 10 as shown below:

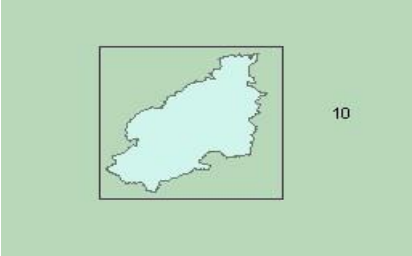


4. Next, you will download three files using LFDAT. If needed, zoom in to get a closer look to the perimeter shapefile. To begin, click the *Extent* tool. A message box pops up on the screen, as shown below:



- If you do not want to see this box again, click the box in the left bottom corner to disable it and click *OK*. Hold the left button on your mouse and drag across the shapefile so that it is encompassed within the extent box, as shown below.

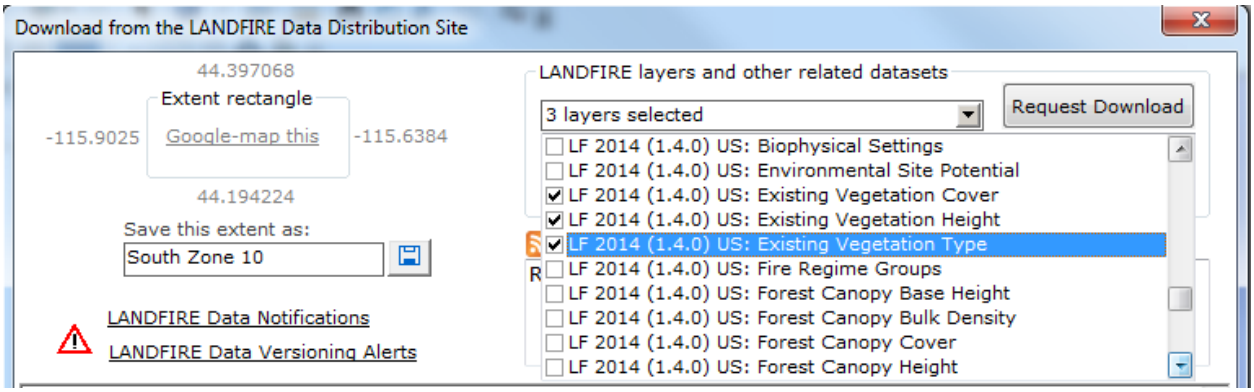
- You can drag the box as many times as needed until you get the extent that you want. In order to do so, you will need to close out the Download Data window that pops up after every extent box draws.



5. Once you have the extent that you want:

   - Type South Zone 10 in Save this extent as: and click the save icon. A dialog box appears stating that your extent saved. Click OK. You will only need to do this once for each extent.

   - Click the down arrow from the LANDFIRE layers and other related datasets and select LF 2014 (1.4.0) Existing Vegetation Cover, 2014 (1.4.0) Existing Vegetation Height, and 2014 (1.4.0) Existing Vegetation Type.



6. Several links in this window provide useful information about the data layer and extent that you will download:

   - Click on Google-map this extent. Your Internet browser will launch, and a window appears showing the full extent of your selection. Close the window after your review.

   - Click on the link and for a brief Overview and pertinent links regarding LF data. Close the window.

   - Click on the link and the metadata file associated with the layer of interest appears. Close the window.

- Click on the RSS link to see the latest LFDAT news regarding new versions, bug fixes, and configuration database updates.

7. The first two links, LANDFIRE Data Notifications and LANDFIRE Data Versioning Alerts, contain important information concerning LANDFIRE products and both are updated as needed.

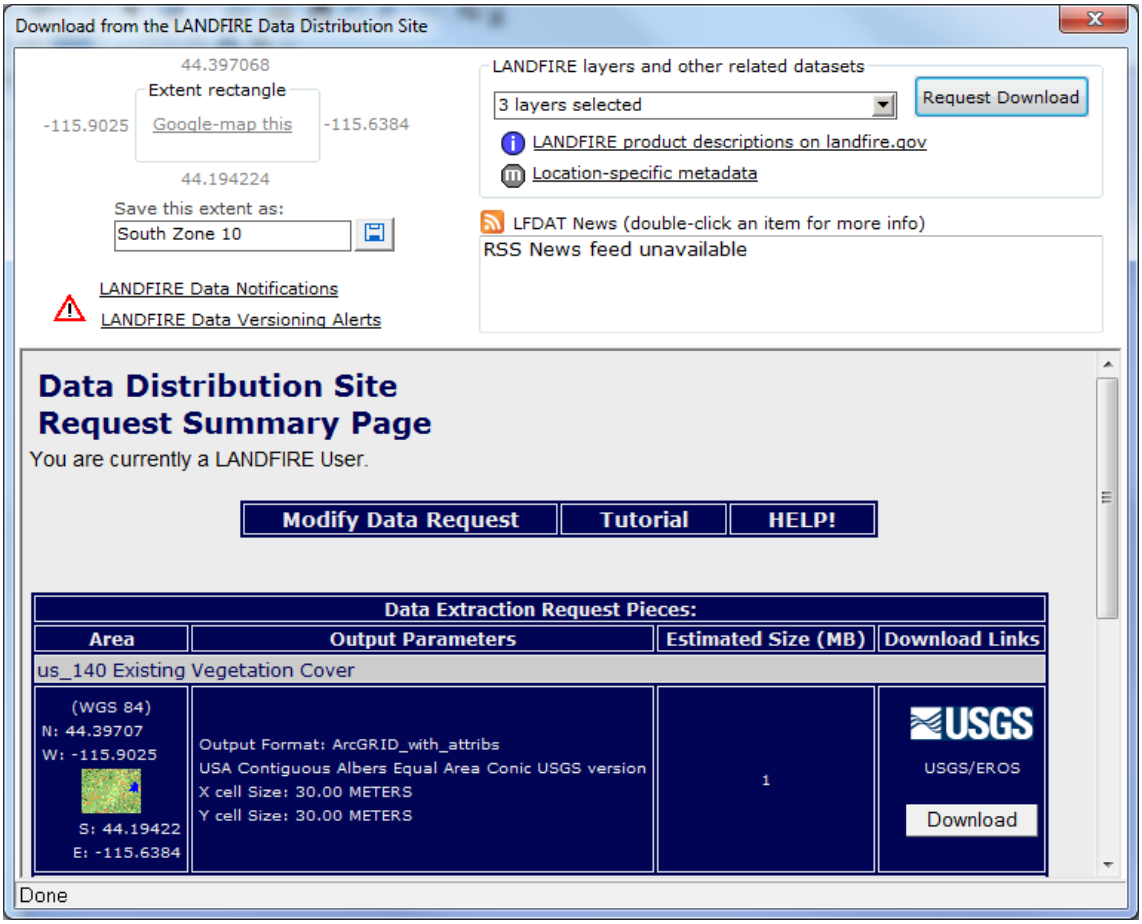
   - Click LANDFIRE Data Versioning Alerts. Which two layers were updated 6/9/2017?

   - Answer: BPS and SCLASS

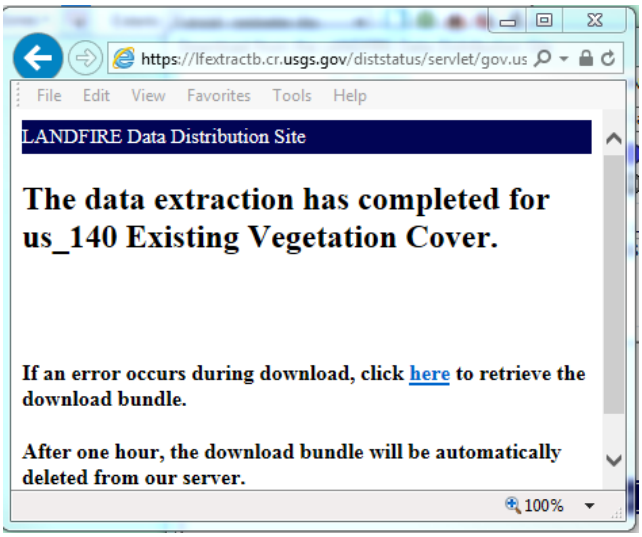
   - Close the versioning window. You are ready to download LANDFIRE data.

8. With **LF 2014 (1.4.0) Existing Vegetation Cover, LF 2014 (1.4.0) Existing** Vegetation Height, and LF 2014 (1.4.0) Existing Vegetation Type selected from the drop down list:

   - Click the Request Download button. This button initiates a process that extracts the data from the LF Data Distribution Site. A Request Summary Page will appear as shown below:



- Select *Download* for the first LF layer and the *Current order status* dialog box appears, providing information on the progress of the data extract.



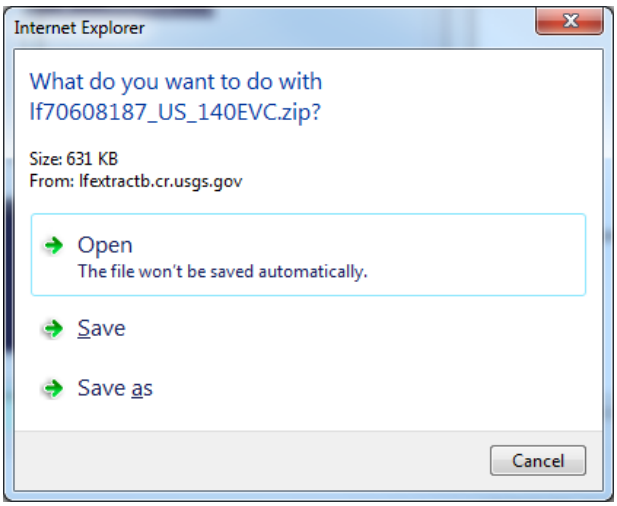
9. A *File Download* dialog box appears when the extract completes.

   - Click Save As. In the Save As dialog box

   - Navigate to C:\LFDAT_tutorial*, and right click in the white space in the dialog box.

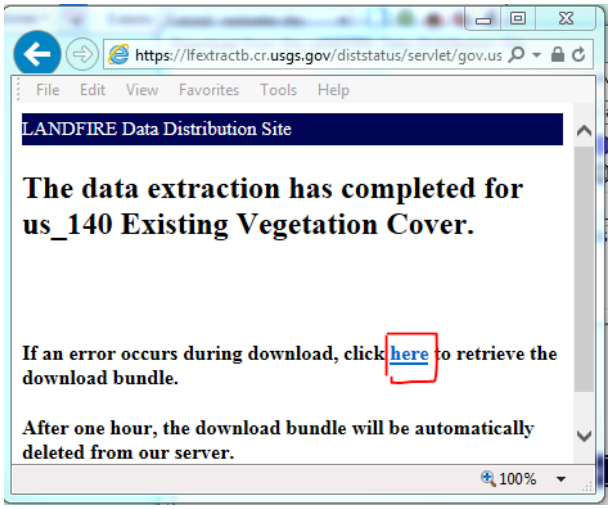
   - Select New > Folder. Name the new folder lfdat_in and double click on it to save. Click and Save.

If you generally save data to a drive other than the **C: drive**,** it is fine to do so. This tutorial uses the **C:** drive for consistency purposes.*

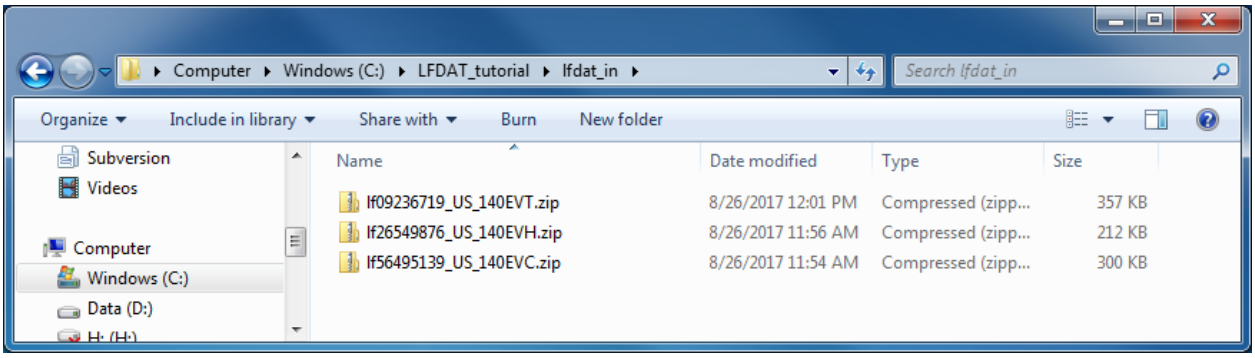


10. A progress window opens during the save process.

    - Verify the zip file downloaded correctly by trying to open the file. If the opening fails (partial download file or zip file won't open), then download it again from the Data Extract window using the here link. After the download is complete and verified, close 'The data extraction has completed' window.



    - Repeat this process for the other two LF layers selected. Notice that for all three downloads, the extent South Zone 10 stayed the same. When the download is complete, you should have three .zip files in lfdat_in.



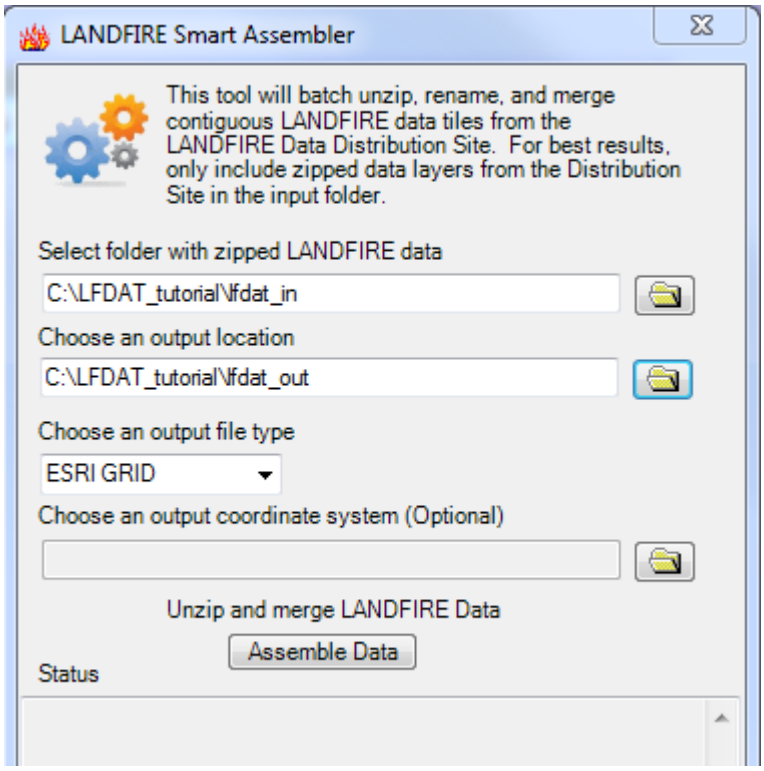
    - Close the Download data from the LANDFIRE Data Distribution Site window.

11. Next, you will use LFDAT to extract and name the .zip files you just downloaded.

    - Click on the Process and Assemble LANDFIRE data  tool, also known as Smart Assembler. In the top entry of the dialog box, navigate to the lfdat_in folder (where the three .zip files reside) using the folder icon.

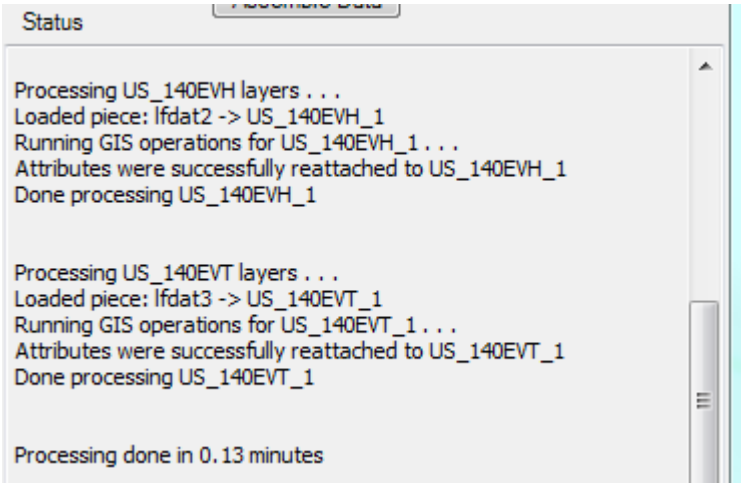
    - Click the bottom entry folder icon to select an output location. Go to C:\LFDAT_tutorial and click on the Make New Folder button to create a new folder. Name the new folder lfdat_out. Keep the default output file type ESRI

GRID*. Leave the optional output coordinate system blankThe *LANDFIRE Smart Assembler* dialog box should look like the following:



** The default output file type is ESRI GRID. This data type will allow the Smart Assembler to attach attributes. If you choose ERDAS IMAGINE or GEOTIFF, attributes are not added automatically with the Smart Assembler. For the purpose of this tutorial, you will use the default ESRI GRID.*

12. Click *Assemble Data*. A status box is provided so that you can watch the progress of the data assembly. Close the *LANDFIRE Smart Assembler* when complete.



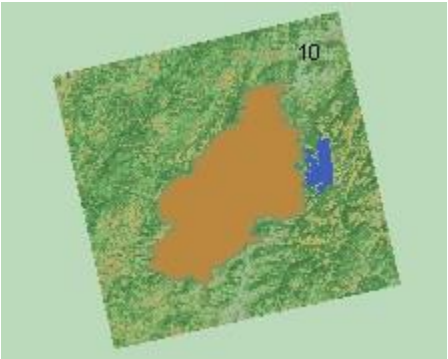
13. Remove the *CONUS Map Zones* layer from the *Table of Contents*. On the LFDAT toolbar, click on the *Add LANDFIRE Data* button and select **us_140evc_1**. Click *Add,* and choose **CLASSNAMES** from the *LFDAT Symbology* drop-down list. Click *Add Layer*.

    - Use the Add LANDFIRE Data button to add us_140evh_1 and us_140evt_1, choosing CLASSNAME/S for symbology.

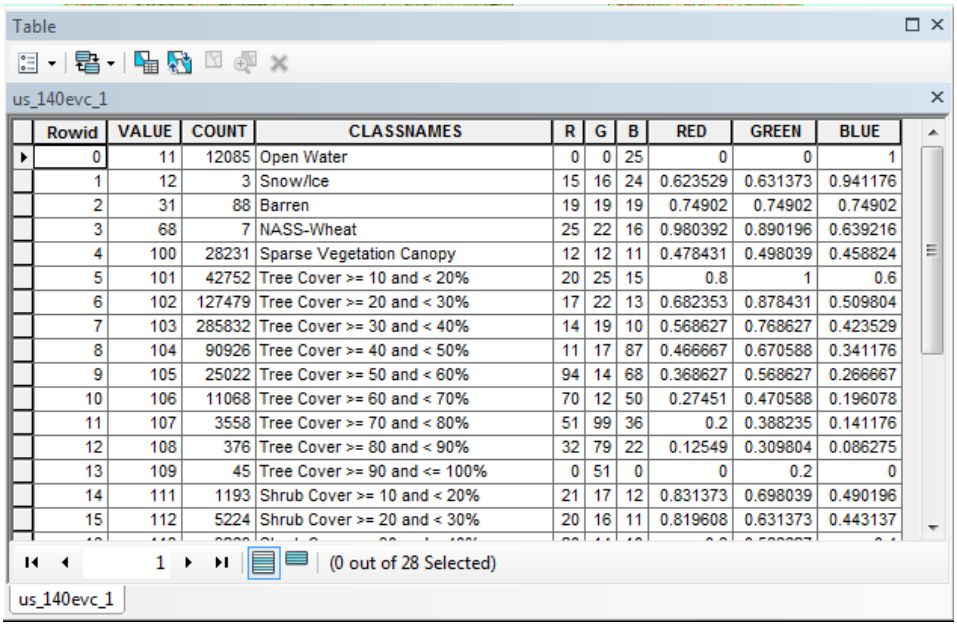
    - Drag perimeter to the top of the Table of Contents. Notice perimeter is contained within the extent of the three existing vegetation layers. Move us_140evc_1 layer below the **perimeter** shapefile.

    - The bounding extents of the data layers are askew in comparison to the perimeter layer. This is because the perimeter layer, which is in a UTM projection, was added to the map project first and sets the coordinate system for the Data Frame.

        - ***However, LANDFIRE Albers is the default projection for LF data, regardless of the projection in the current ArcMap project. In this case, the three LF layers projected on the fly to match the UTM projection for map display purposes only.***



14. Right click the **us_140evc_1** layer and select *Open Attribute Table*. Notice that attributes are attached to the grid. Check the other two layers to confirm the attributes attached properly.



Table

us_140evc_1

Rowid	VALUE	COUNT	CLASSNAMES	R	G	B	RED	GREEN	BLUE
0	11	12085	Open Water	0	0	25	0	0	1
1	12	3	Snow/Ice	15	16	24	0.623529	0.631373	0.941176
2	31	88	Barren	19	19	19	0.74902	0.74902	0.74902
3	68	7	NASS-Wheat	25	22	16	0.980392	0.890196	0.639216
4	100	28231	Sparse Vegetation Canopy	12	12	11	0.478431	0.498039	0.458824
5	101	42752	Tree Cover >= 10 and < 20%	20	25	15	0.8	1	0.6
6	102	127479	Tree Cover >= 20 and < 30%	17	22	13	0.682353	0.878431	0.509804
7	103	285832	Tree Cover >= 30 and < 40%	14	19	10	0.568627	0.768627	0.423529
8	104	90926	Tree Cover >= 40 and < 50%	11	17	87	0.466667	0.670588	0.341176
9	105	25022	Tree Cover >= 50 and < 60%	94	14	68	0.368627	0.568627	0.266667
10	106	11068	Tree Cover >= 60 and < 70%	70	12	50	0.27451	0.470588	0.196078
11	107	3558	Tree Cover >= 70 and < 80%	51	99	36	0.2	0.388235	0.141176
12	108	376	Tree Cover >= 80 and < 90%	32	79	22	0.12549	0.309804	0.086275
13	109	45	Tree Cover >= 90 and <= 100%	0	51	0	0	0.2	0
14	111	1193	Shrub Cover >= 10 and < 20%	21	17	12	0.831373	0.698039	0.490196
15	112	5224	Shrub Cover >= 20 and < 30%	20	16	11	0.819608	0.631373	0.443137

1 (0 out of 28 Selected)

us_140evc_1

- Save your project as **C:\LFDAT_tutorial\tutorial.mxd** and close *ArcMap*.

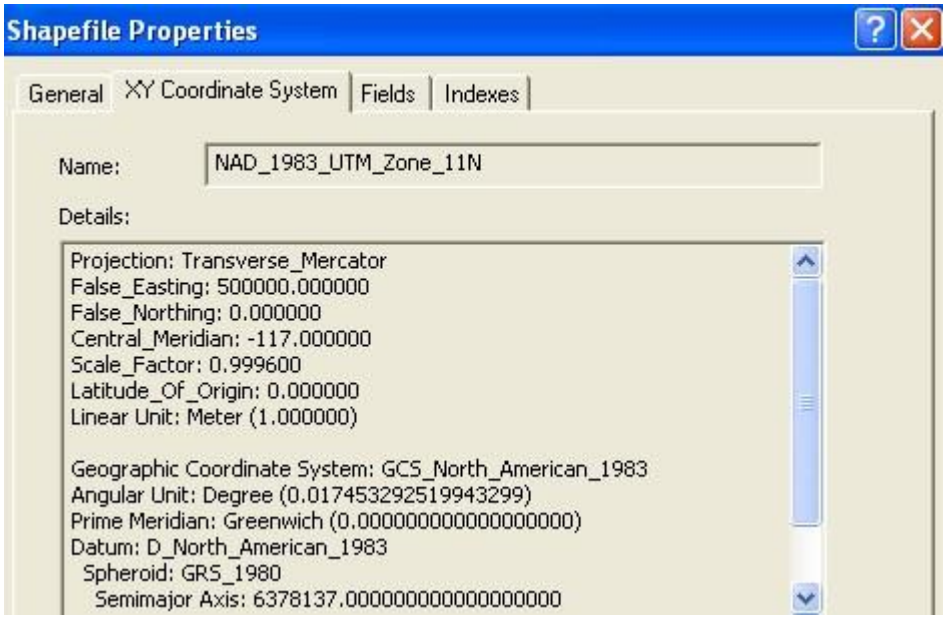
In the next section, you will permanently reproject the LF layers to match the coordinate system of the perimeter layer. While there are several methods to reproject data, you will use LFDAT. You will reference a saved extent, project a layer, and attach attributes from the original raster attribute table.

III. Additional LFDAT Functionality

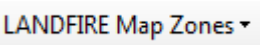
Use Saved Extent, Reproject data to local projection, and Attach Attributes

1. Open ArcCatalog. Right-click on C:\LFDAT_tutorial\perimeter.shp and select Properties.

   - Select the XY Coordinate System tab. Notice that the projection is NAD 1983 UTM Zone 11N, as shown below:



   - Start ArcMap with A new empty map.

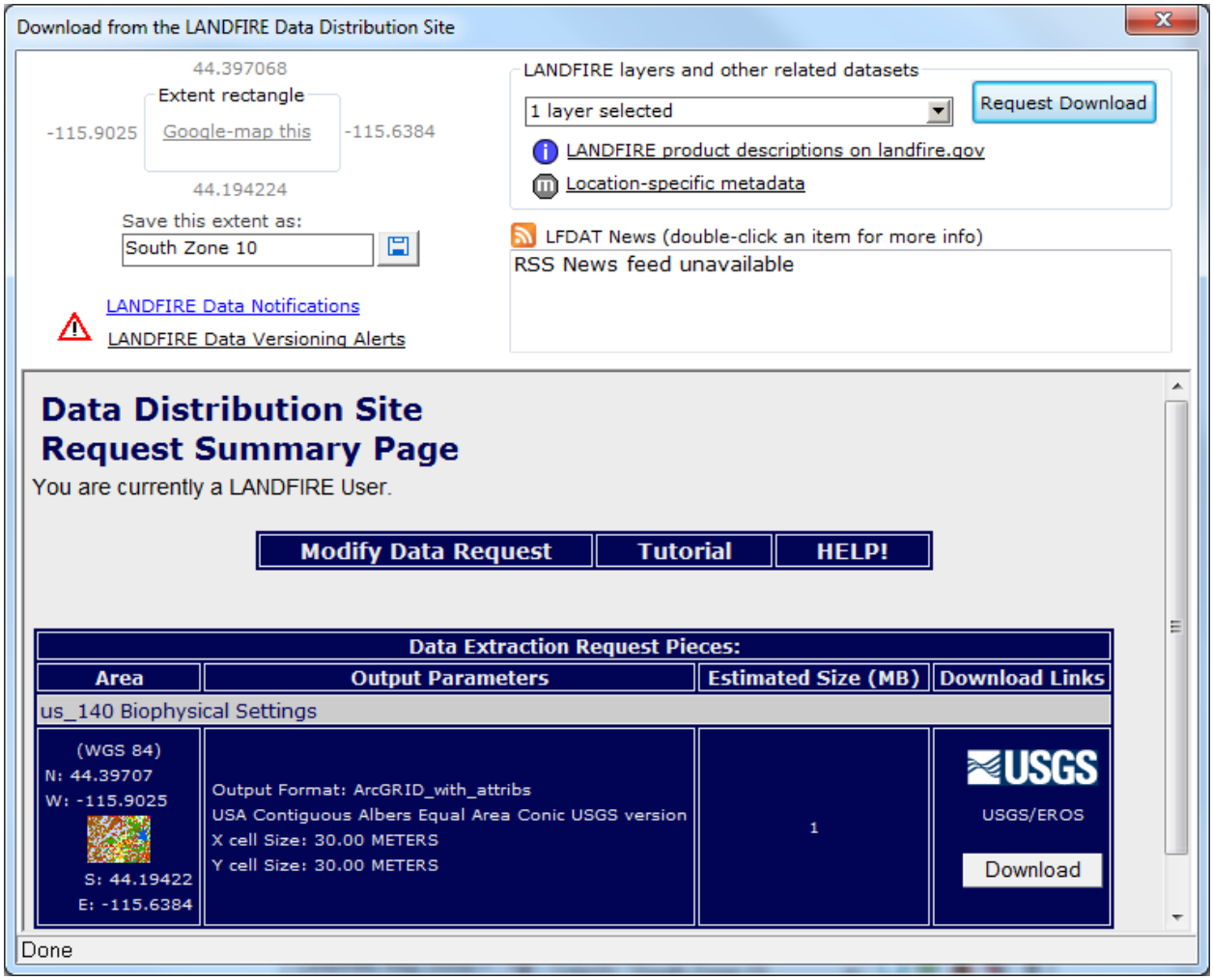
   - Add the CONUS layer using the M 

down arrow. Also add the perimeter.shp from the tutorial.

2. You will now extract another layer using the extent from the previous lesson.

   - Turn off the display of the CONUS layer. Next, click the down arrow on the Extents box as shown below. Select South Zone 10. This is the extent used in the previous section.

   - After selecting the *South Zone 10* extent, the data download window appears. Select **LF 2014 (1.4.0) Biophysical Settings** from the LF layers list, as shown below. Click the *Request Download* button and then *Download* from the *Request Summary Page*.



- Save the file in a new folder called lfdat_in2 under C:\LFDAT_tutorial. Remember, in order for the Assembler to work properly, files need to be saved in a new folder.

- After downloading the zip file, verify it opens correctly, if not, try downloading it again. Close 'The data extraction has completed' window, as well as the Request Summary Page after downloading.

3. Next, you will use the Smart Assembler to unzip the Biophysical Settings file, project the grid to UTM, and join the attributes to the grid.

   - Click on the Process and Assemble LANDFIRE Data button. In the top entry of the dialog box, navigate to the lfdat_in2 folder (where the .zip file resides) using the folder icon button.

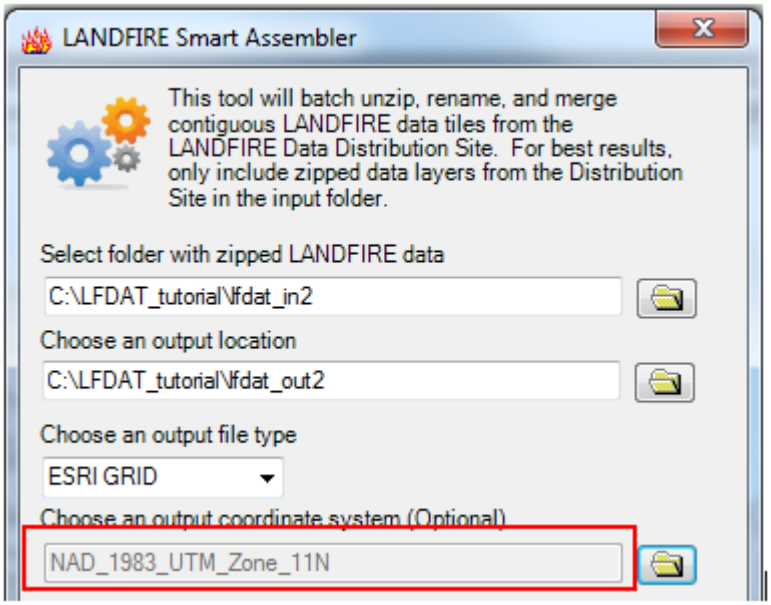
   - Click the bottom entry folder icon to select an output location. Click on C:\LFDAT_tutorial to highlight, and select Make New Folder. Name the new folder lfdat_out2.

- Under Choose an output coordinate system (Optional), click on the browse button  to open the Spatial Reference window.

- Click on the Add Coordinate System down arrow button  and select Import. Navigate to and select perimeter.shp.

- Click Add and then Finish.

  - *LF 2014 (1.4.0) Biophysical Settings will be in the same projection as perimeter.shp.*

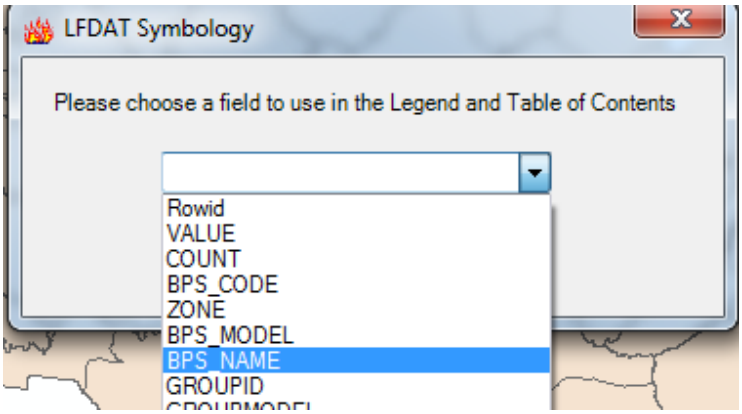


- Click the Assemble Data button to begin the process and then close the Smart Assembler when the process is complete.

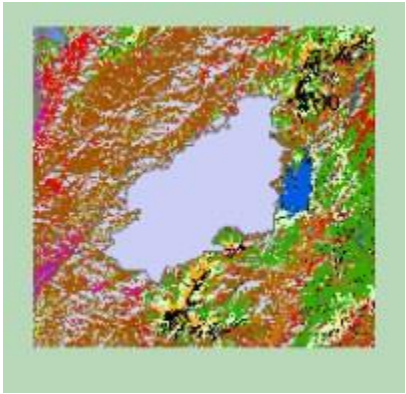
4. Use the Add LANDFIRE Data  to navigate directly to the lfdat_out2 folder, where the new LF 2014 (1.4.0) Biophysical Settings layer resides. This button allows you to add data to the map while at the same time specifying which attribute field you want to display in the map.

   - Add us_140bps_1 to the map. The LFDAT Symbology dialog box appears.

   - Click the down arrow and choose BPS_NAME as shown below and click Add Layer.



- The us_140bps_1 layer now appears in the Table of Contents.
- Right click on the us_140bps_1 and select Zoom to Layer.
- Move the perimeter layer above the us_140bps_1 layer. The map should look similar to the one below:



Notice that the extent of the data doesn't appear askew like it did in the previous exercise.

However, remember that the first layer added to the map sets the coordinate system for the Data Frame. The LF layer was added to the map project first and the map then displays in the LF Albers projection, even though both **us_140bps_1** and **perimeter** are both in NAD 1983 UTM Zone 11N.

Analysis performed using data with different projections could produce unexpected results. Therefore, it is good practice to understand the map projection characteristics of the data and, when necessary, reproject data to best fit local needs. The **perimeter.shp** file is in the local coordinate system – UTM Zone 11N. We will use this file's coordinate system to reproject the Existing Vegetation Type layer to the local projection.

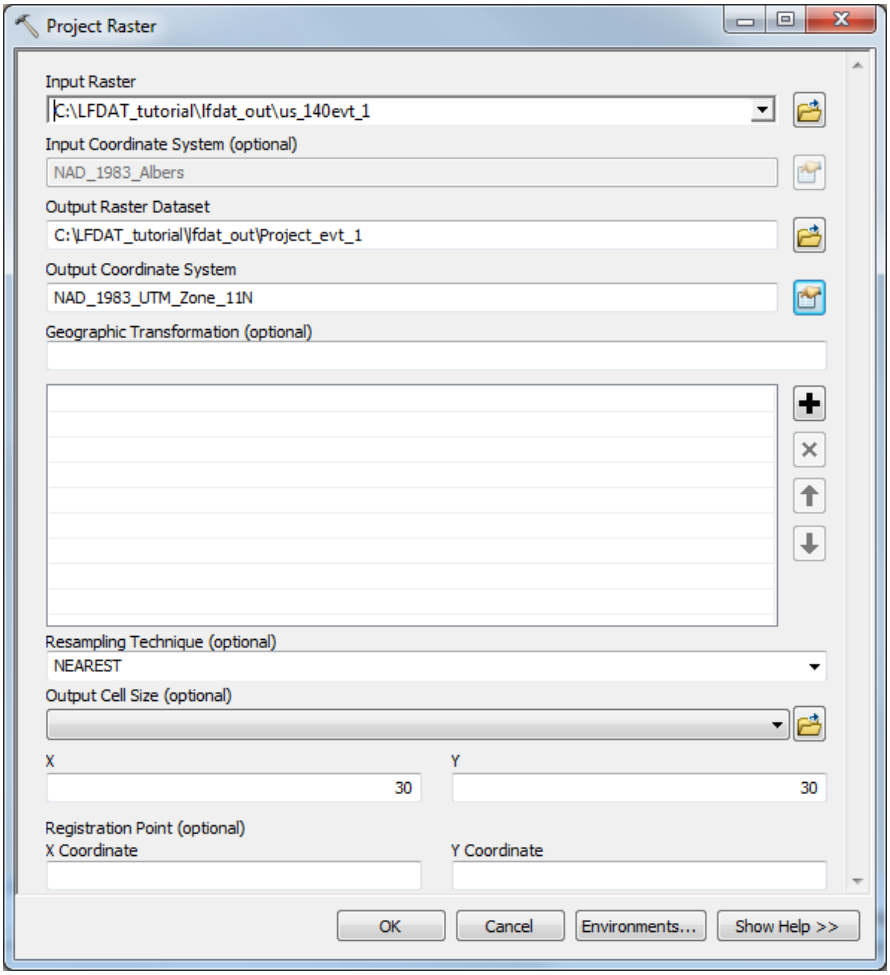
IV. Reproject Existing Vegetation Type with ArcToolbox and Join Attributes with LFDAT

1. Click on the *ArcToolbox* icon and navigate to *Data Management Tools* > *Projections and Transformations* > *Raster* > *Project Raster*.

   - Double-click on the Project Raster and click the down-arrow under Input Raster and navigate to C:\LFDAT_tutorial\lfdat_out and select us_140evt_1.

   - For output raster, navigate to C:\ lfdat_out and name the new grid Project_evt_1. For Output Coordinate System, click on the icon, select the NAD_1983_UTM_Zone_11N under Favorites or click on the Add Coordinate System down arrow button and select Import.

   - Navigate to C:\LFDAT_tutorial and select perimeter.shp again for the local UTM Zone 11N coordinate system. Select OK on the Spatial Reference Properties dialog box. Confirm that your Project Raster dialog box is the same as the one below:



- Click OK. Close the Project Raster dialog box when the process completes if it doesn't automatically. The new Proj_evt_1 layer will display on the Table of Contents. The legend colors may still be the same as us_140evt_1, however the descriptive attribute (CLASSNAME) is not attached to the records in the attribute table.

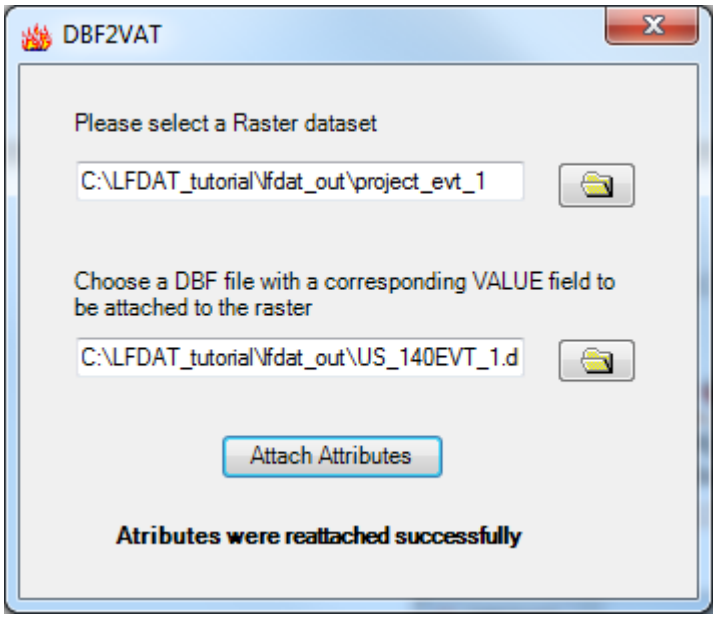
- Right-click on Proj_evt_1 in the Table of Contents and choose Open Attribute Table from the drop down menu. The attributes dropped when the grid was reprojected. All attributes except Rowid, Value, and Count are stripped during any raster analysis.

- Close the attribute table and remove Proj_evt_1 from the Table of Contents.

- Next, you will reattach attributes lost during the reproject process.

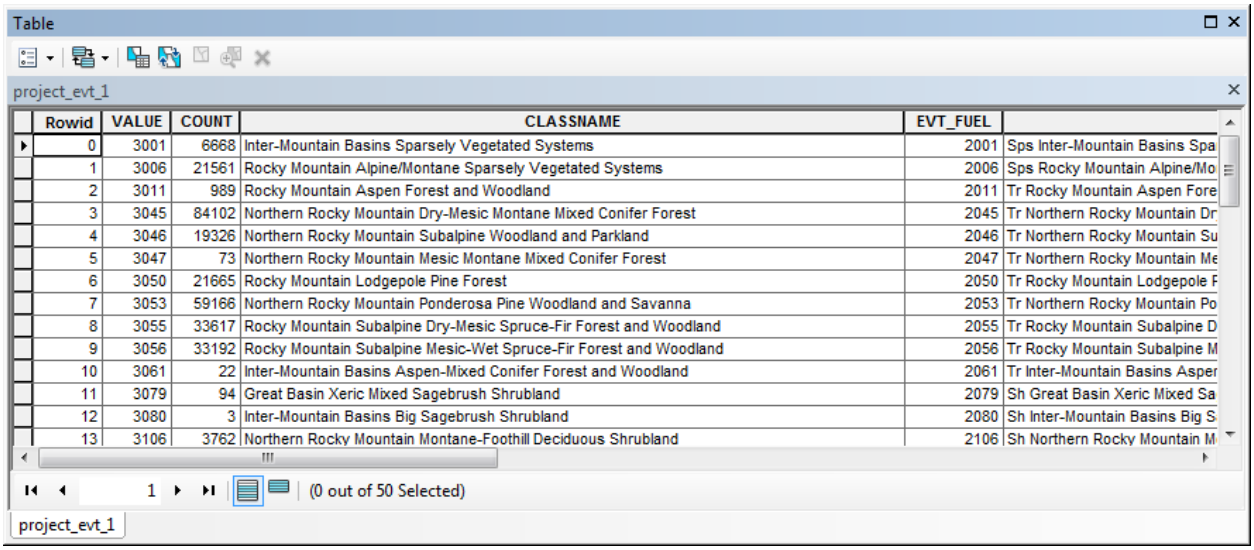
- Click on the LFDAT Raster Utilities button and select Attach DBF to ArcGrid VAT. Click on the top browse button and navigate to proj_evt_1. Do the same with the bottom browse button to add the us_140evt_1 .dbf file, as shown below.

- Click Attach Attributes. A completion message will display in the same window. Close all dialog boxes when the process completes.



- Use Add LF Data to add the proj_evt_1 layer to the Table of Contents. Choose the CLASSNAME field for display. Click Add Layer.

- Right click proj_evt_1 in the Table of Contents and select Open Attribute Table to confirm the attributes attached. Close the attribute table.



Table

project_evt_1

Rowid	VALUE	COUNT	CLASSNAME	EVT_FUEL	
0	3001	6668	Inter-Mountain Basins Sparsely Vegetated Systems	2001	Sps Inter-Mountain Basins Spa
1	3006	21561	Rocky Mountain Alpine/Montane Sparsely Vegetated Systems	2006	Sps Rocky Mountain Alpine/Mo
2	3011	989	Rocky Mountain Aspen Forest and Woodland	2011	Tr Rocky Mountain Aspen Fore
3	3045	84102	Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	2045	Tr Northern Rocky Mountain Dr
4	3046	19326	Northern Rocky Mountain Subalpine Woodland and Parkland	2046	Tr Northern Rocky Mountain Su
5	3047	73	Northern Rocky Mountain Mesic Montane Mixed Conifer Forest	2047	Tr Northern Rocky Mountain Me
6	3050	21665	Rocky Mountain Lodgepole Pine Forest	2050	Tr Rocky Mountain Lodgepole F
7	3053	59166	Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	2053	Tr Northern Rocky Mountain Po
8	3055	33617	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	2055	Tr Rocky Mountain Subalpine D
9	3056	33192	Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland	2056	Tr Rocky Mountain Subalpine M
10	3061	22	Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	2061	Tr Inter-Mountain Basins Asper
11	3079	94	Great Basin Xeric Mixed Sagebrush Shrubland	2079	Sh Great Basin Xeric Mixed Sa
12	3080	3	Inter-Mountain Basins Big Sagebrush Shrubland	2080	Sh Inter-Mountain Basins Big S
13	3106	3762	Northern Rocky Mountain Montane-Foothill Deciduous Shrubland	2106	Sh Northern Rocky Mountain M

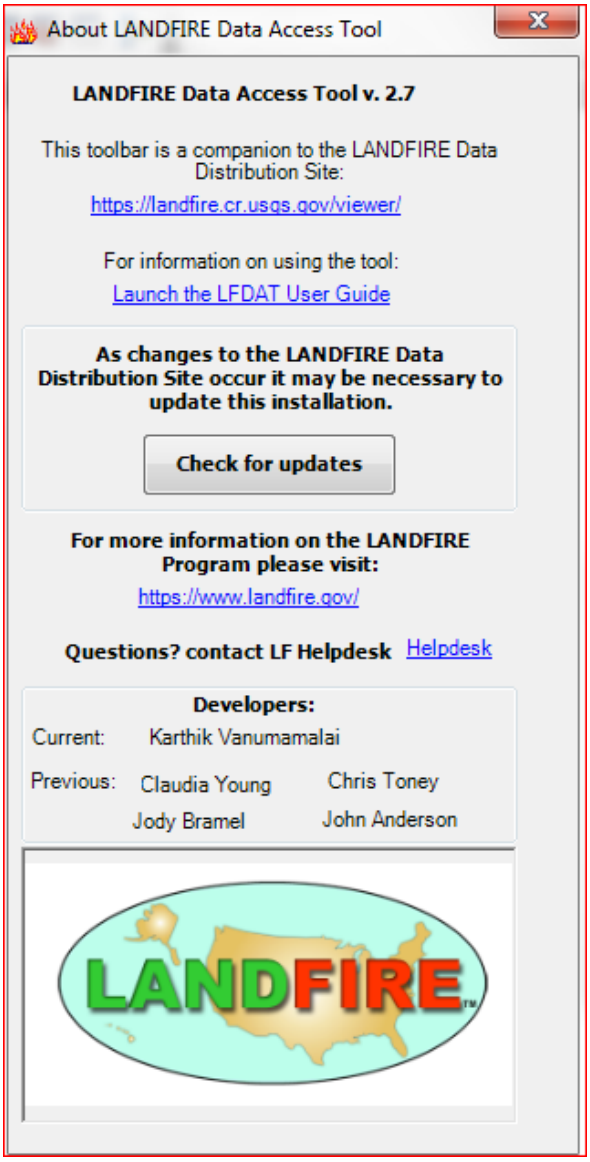
1 (0 out of 50 Selected)

project_evt_1

IV. Accessing LFDAT User Guide and the About Button

1. Click on the About LANDFIRE Data Access Tool . A window like the following appears.

2. Click on the Launch the LFDAT Help and Tutorial link. This will open the LFDAT User Guide.



3. Scroll through the LFDAT User Guide, which describes Known Issues in detail, and provides an in-depth discussion on LFDAT capabilities. Close the document when you are done.

4. Also, for other known issues not described in the User Guide, visit LF's FAQ page. LFDAT questions are at the bottom.

5. It is important to know that if you are having problems with LFDAT, the About LANDFIRE Data Access Tool and the LFDAT FAQs are good places to begin troubleshooting.

6. Remember to use the Check for updates button. If any one of the three elements– Application version, Configuration database, or Feature geodatabase – are not current, LFDAT may not function properly.

7. For further explanation of LFDAT capabilities, refer to the LFDAT User Guide or the LFDAT FAQs.

Appendix A:

***Internet Explorer 7 Users:** In order to access and download data from the Data Distribution Site using LFDAT, apply the following settings. Step 10 is the most critical:

1. As administrator, right-click on the Internet Explorer icon and select Properties (or open I.E. and select Tools > Internet Options).
2. Select the Security tab in the Internet Properties window.
3. Select Trusted Sites on the Security Panel.
4. Verify the Security Level for This Zone is set to Medium, change it to Medium if not already set.
5. Click the Sites button in the Security Panel.
6. Uncheck the box for Require server verification (https:) for all sites in this zone
7. Type **http://landfire.cr.usgs.gov/viewer/** in the **Add this Web site to the zone:** text box.
8. Click **Add**.
9. Click **Close.**
10. Click the **Custom Level** button.
11. Scroll down to **Downloads** section, select **Enable for Automatic Prompting for file downloads.**
12. Click **OK.**
13. Click **Yes** in the **Warning** window.
14. Click **OK** in the **Internet Options** window to close.