

LESSON 13: *FARSITE* SIMULATION DIRECTIONS

1. Start *FARSITE*. **BOLD** items are file names or *FARSITE* commands.
2. Go to **INPUT | Project Inputs**
 - a. Click on the box next to **Landscape File (.LCP)** and navigate to where your data is located. Select (Open) the file named **eldorado.lcp**.
 - b. Click on the box next to **Adjustments (.ADJ)** and navigate to where your data is located. Select (Open) the file named **eldorado.adj**.
 - c. Click on box next to **Moistures (.FMS)** and navigate to where your data is located. Select (Open) the file named **eldorado.fms**.
 - d. Click on box 1 under **Weather Files (.WTR)** and navigate to where your data is located. Select (Open) the file named **eldorado.wtr**.
 - e. Click on the box 1 under **Wind Files (.WND)** and navigate to where your data is located. Select (Open) the file named **eldorado.wnd**.
 - f. Click on the box **Attached Vector Files** this will open another dialogue box **“Attached Vector Files”**
 - (1.) Click on the box **Add File (+)**. This will open another dialouge box **“View Vector File”**. Click on **“Select Input File”**. This will open yet another dialogue box that will allow you to select an individual file. In the box **Files of Type** make sure that the file type is set to **AV Shape Files (*.shp)**. You do this by clicking on the down arrow and list of possible file types you can choose from are displayed. Highlight **AV Shape Files (*.shp)**.
 - (2.) Select the file **roads.shp**. Click on **OK**.
 - (3.) Repeat steps f, f (1) and f (2) for the following files: **917perim.shp; subdivision.shp, spot-N.shp**.
 - (4.) After you have all four files attached, click **OK** in the dialogue box **“Attached Vector Files”**
 - g. Now make a project. This is the only way all these files you just attached to the landscape file (**eldorado.lcp**) will be permanently linked.
 - (1.) Go to the box **“Save Project.”** Make sure the file name path and destination is where you want it to go and name this file **eldorado.fpj**.
 - h. Now, click on the box **OK** in the dialogue box **“FARSITE Project.”**
3. Next go to **OUTPUT | Export and Output**. This will open a dialogue box **“Export and Output Options”** under **Display Units (graphs and tables)** click on **English**. This will make all your output units in feet and miles for perimeter and area. Click on **OK** at the bottom.

4. Go to **MODEL | Parameters**. This will open a dialogue box called “**Model Parameters**.” This is where you set the **Time Step, Visible Steps, Perimeter Resolution, and Distance Resolution**.
 - a. Set Time Step: 30 min.; Visible Step: 1 hour (disregard secondary visible); Perimeter Resolution: 60 meters, and Distance Resolution 30 meters.
 - b. Click **OK**.
5. Go to **MODEL | Fire Behavior Options**. This will open a dialogue box called “**Fire Behavior Options**.” **Enable Crown Fire** should be checked. Click on **Enable Spot Fire Growth** and set the **Ignition Frequency** to **1%**. Leave all other options as-is. Now click **OK**.
6. Go to **SIMULATE | Initiate/Terminate**. This will draw the landscape complete with the roads, the subdivision of concern, the fire perimeter as of the end of the day on 9/17, and the spot fire.

At this time you can also change the color and size of the points and lines of the attached shapefiles. To the right of the landscape is the FARSITE Simulation Legend. In this legend you can see the attached vector files. Moving your mouse into one of the shapefile names and double clicking with your left mouse button will allow you to change the color while clicking once with your right mouse button will allow you to change the size of the point and the line style being displayed.

For the file **roads.shp**: In **Line Style** select **Solid, Width=3** and in **Colors** select **light yellow**. Click on **OK** after each selection.

For the file **subdivision.shp**: In **Line Style** select **Solid, Width=3** and in **Colors** select **orange**.

For the file **917perim.shp**: In **Line Style** select **Solid, Width=3** and in **Colors** select **red**.

For the point **spot-N.shp**: In **Point Style** select **Round, Width=5**. In **Colors** select **magenta**.

7. Go to **SIMULATE | Duration**. This will open a dialogue box “**Simulation Duration**.”
 - (a) Check the box next “**Use Conditioning Period for Fuel Moistures**”
 1. under the conditioning column Month will equal 9 and Day will equal 17 while the Hour and Min boxes will be empty.
 - (b) In the **Starting** column.
 1. Under Month click on the up arrow on the left and the number 9 will appear (September).
 2. Under Day click on the up arrow on the left and change this to 18.
 3. Under Hour click on the up arrow on the left until 0900 shows up.
 - (c) In the **Ending** column.
 1. The only value you need to change is under Hour. Click on the up arrow until the number 1900 is displayed.

- (d) You can disregard the Minute box.
 - (e) Click **OK**.
8. You can zoom in to a smaller area on the map to see better detail. Go to **View | Change View Port**. Adjust the slider buttons on each side of the screen to reduce the size of each edge by about $\frac{1}{4}$. Click **OK**. If you need to adjust the map area displayed, repeat this step.
9. To keep the fire from burning into the black in the simulation, import a barrier file. For this, we'll use the final perimeter from 9/17. Go to **Simulate | Modify Map | Import Barrier File**. In the box **Files of Type** make sure that the file type is set to **AV Shape Files (*.shp)**. You do this by clicking on the down arrow and list of possible file types you can choose from are displayed. Highlight **AV Shape Files (*.shp)**. Select **917perim.shp** and click **OK**.
10. You are now ready to locate the ignition. At the top of the screen, right hand side there is an icon shaped like a drip torch. Left click on this icon to activate the drip torch. Move the cursor onto the landscape and the drip torch will appear.
- (a) Place the tip of the drip torch on your spot fire, then left click and right click your mouse buttons. Immediately move the drip torch off to the side without touching your mouse buttons or you will place another ignition on the landscape.
11. At the top of the screen left hand side you will see icons shaped like a Stopwatch, Clock, and a Wind Vane. Click on each of these with your left mouse button. Then click and drag each of these over to the right of the landscape.
12. You are NOW ready to model! Go to **SIMULATE | Start/Restart** or the **Checkered Flag** icon and click with your left mouse button. If you look at the bottom of the screen you will see it says **Simulation Running**.
- (a) Shortly after you start the simulation you will notice the Wind Vane change directions and the Elapsed Time will give you the number of days, hours, and minutes of the simulation. Current Time gives you the date and time you are at in the simulation.
 - (b) This simulation should take from 5-10 minutes depending on your particular laptop configuration.
13. How many acres and how big is the perimeter?
- (a) Go to **OUTPUT | Data Tables** and open the **Area Table** and **Perimeter Table**.
 - (b) Grab the lower left-hand corner of each and enlarge until the entire table is visible.
 - (c) The blue numbers are the area (acres or hectares) and perimeter (miles or kilometers) for each of the 30 min. Time Steps. The red numbers are the area and perimeter for the 1 hour Visible Time Steps.
 - (d) The size at 1900 on 9/18 is approximately 2,070 acres and the perimeter at 1900 on 9/18 is about 11.9 miles.

- (e) You could also interpolate the area and perimeter graphs to get this information.

14. Querying the landscape.

- (a) With the landscape displayed move your cursor onto the landscape and click the left mouse button. This will display for you the UTM coordinates, elevation, slope, aspect, fuel model and canopy characteristics for that specific site on the landscape.
- (b) Check the box **Query Fire** and click the left mouse button within the new burn area and outside the burn area. This will display fire behavior characteristics such as flame length (FL), rate of spread (ROS), and fireline intensity (FLI).

File List:

1. 917perim. (shp,shx,dbf): This is a shape file generated in ArcView and shows the perimeter as of the end of the previous day (September 17). It is a line (polygon) file.
2. Roads. (shp,shx,dbf): This is a shape file generated in ArcView that shows all the roads in the area. It is a line file.
3. Subdivision.(shp,shx,dbf): This is a shape file generated in ArcView and shows the subdivision of concern. It is a line file.
4. Spotfire.(shp,shx,dbf): contains the point of origin for the spotfire you are going to model. It is a single point.
5. Line_ignit.(shp,shx,dbf): contains the active perimeter north of the main road as of the end of the day on 9/17. It is a line file.
6. Streams.(shp,shx,dbf) and trails.(shp,shx,dbf). These are shape files generated in ArcView and show the major streams and trails in the area (for display detail).
7. Aspect.asc: this ASCII file has the aspect information for the landscape file. It was generated in ARC/INFO and it is in degrees.
8. Crown.asc: this ASCII file has the canopy cover information for the landscape file. It was generated in ARC/INFO. It has canopy cover in categories.
9. Elev_ft.asc: this ASCII file has the elevation information for the landscape file. It was generated in ARC/INFO and it is in feet.
10. Fuels.asc: this ASCII file has the fuel model information for the landscape file. It was generated in ARC/INFO. It has no custom fuel models.
11. Slope_pct.asc: this ASCII file has the slope information for the landscape file. It was generated in ARC/INFO and is in percent.
12. Eldorado.adj: this is an ASCII text file and contains the rate of spread adjustments for each of the 13 standard fire behavior fuel models.
13. Eldorado.fms: this is an ASCII text file and contains the initial fuel moisture settings for each of the 13 standard fire behavior fuel models.
14. Eldorado.wnd: this is an ASCII text file and contains the wind information for the projection period.
15. Eldorado.wtr: this is an ASCII text file and it contains the temperatures, relative humidity etc., for the projection period.
16. Eldorado.lcp: this is the landscape file created for the exercise.
17. Eldorado.fpj: this file contains the landscape file with the appropriate wind(.wnd), weather(.wtr), fuel moisture(.fms), rate of spread adjustment(.adj) files, and ancillary shape files attached.
18. Eldorado_Ex19.bmk: this is a bookmark file for the exercise with all the required model parameters set. Loading this file in *FARSITE* will allow you to run the simulation with out setting anything else. It has two companion files (eldorado_Ex19, .bmi, .dat) that it needs to be able to work, do not delete these from the directory.
19. Eldorado.jpg: A photo taken from the subdivision, looking south toward the northern perimeter at the end of the day on 9/17.