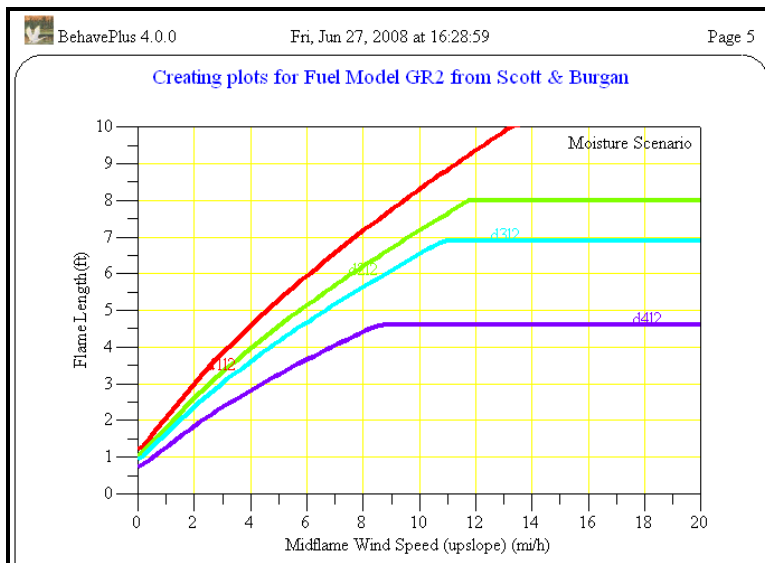
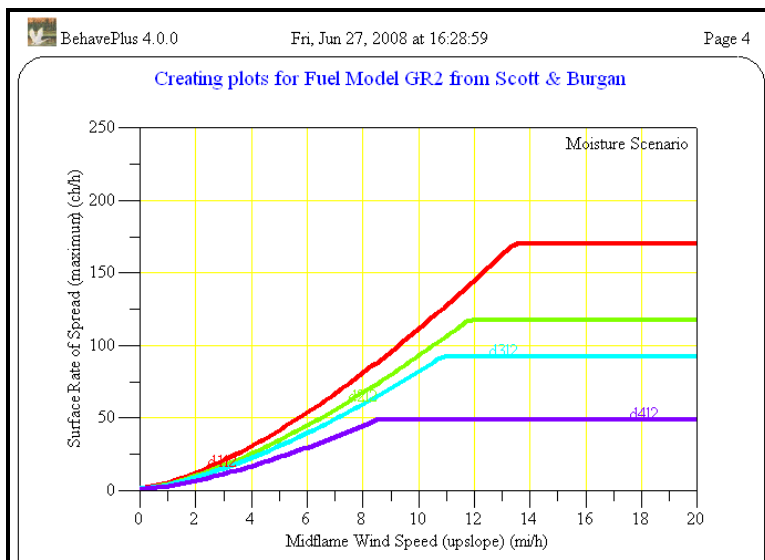


Exercise Answers

1. Change your plots for the GR2 Fuel Model to look like this:



From the lesson, the **BasicStart.bpw** worksheet should look like the following:

The screenshot shows the BehavePlus 4.0.0 software interface. The title bar indicates 'BehavePlus 4.0.0' and 'Page 1'. The main window contains several input sections:

- Inputs: SURFACE**
 - Description: Exercise 1
- Fuel/Vegetation, Surface/Understory**
 - Fuel Model: gr2
- Fuel Moisture**
 - Moisture Scenario: d112, d212, d312, d412
- Weather**
 - Midflame Wind Speed (upslope): 0 20 mi/h
- Terrain**
 - Slope Steepness: 0 %

- Go to the **Configure > Appearance preferences > Graph Elements** tab.
- Set **Rainbow Colors = 4**.
- Set **Curve Width = 4**.
- Calculate the run.
- Check the box **Specify graph Y axis limits**.
- Change the Surface Rate of Spread (maximum) Y Axis Maximum to 250.
- Change the Flame Length Y Axis Maximum to 10.

This won't give you the same colors as are in the publication, but there are now four different colors. In addition, the labels on the curves are automatic in BehavePlus and can't be changed to match those in the Fuel Model publication. You can, however, export the results to a spreadsheet and label them as you desire.

Question – What is the purpose for changing the scales?

It is easier to compare fire behavior for two Fuel Models if the plots use the same scale.

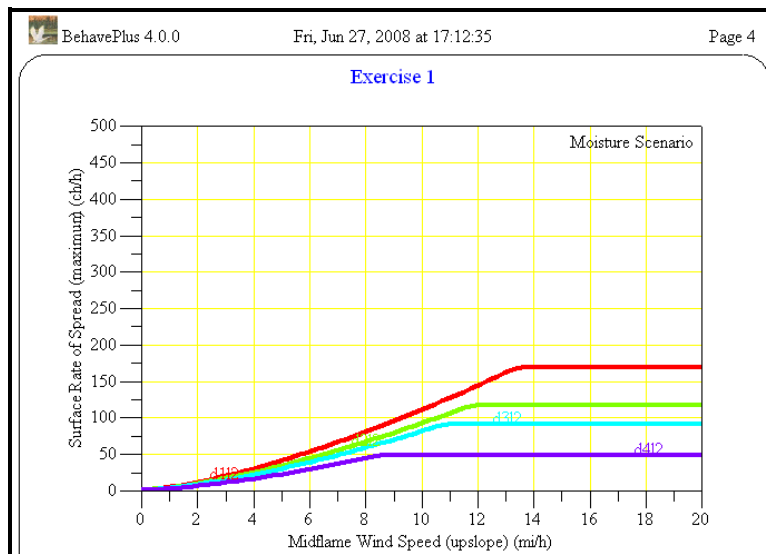
Question – Is the scale the same for all of the GR Fuel Models in the Scott and Burgan publication? What are they? Fill in the numbers in the table below.

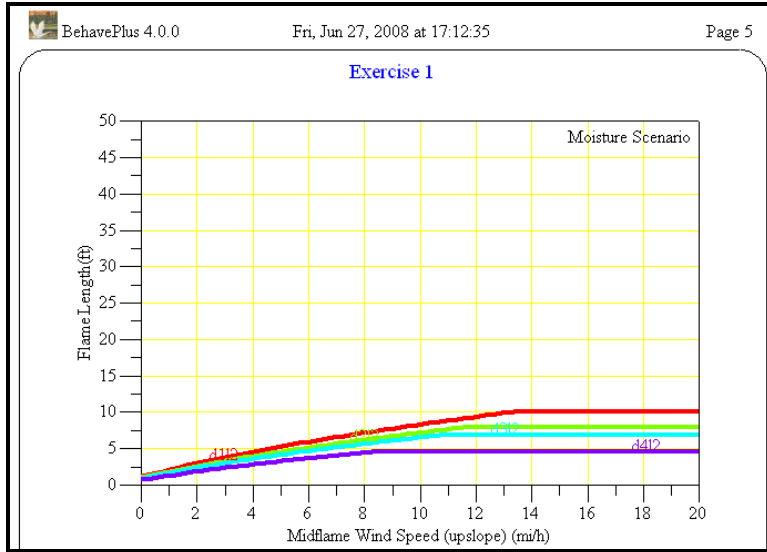
No, the scales are not all the same. The scales are chosen to highlight the dynamics of each individual Fuel Model rather than compare results across Fuel Models. Look at the publication to fill in the table as follows:

Fuel model	ROS max (ch/h)	FL Max (ft)
GR1	50	5
GR2	250	10
GR3	250	25
GR4	500	25
GR5	500	25
GR6	500	50
GR7	500	50
GR8	500	50
GR9	500	50

Change the plots you did for GR2 so they use the scales used for GR9.

- Calculate the run again.
- Specify the Surface Rate of Spread and Flame Length limits to those of GR9 (500 ch/h and 50 ft, respectively).





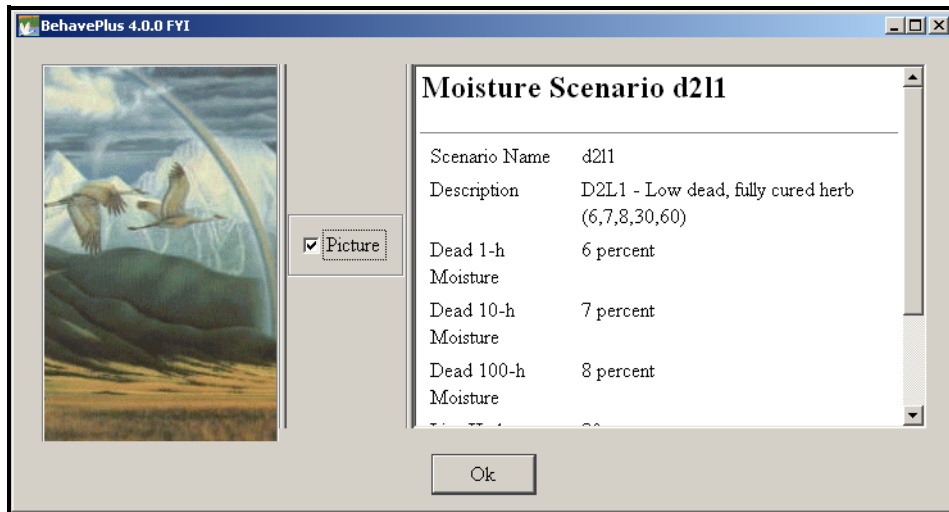
- Twelve grass Fuel Models were compared in the lesson using fuel Moisture Scenario D2L2. Do similar comparisons using other Moisture Scenarios. Compare the bar charts for Surface Rate of Spread for D2L1, D2L2, D2L3, and D2L4. Use the same scale (y max) for each plot

Question – What are the moisture values for each of these Moisture Scenarios? Fill in the numbers in the table below.

To find the values, look at the name associated with each Moisture Scenario:

d211 D2L1 - Low dead, fully cured herb (6,7,8,30,60)

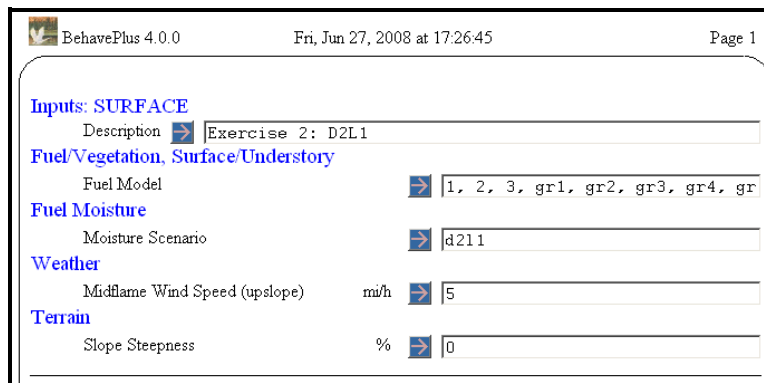
Or, right-click on the selection list to view the parameter values.



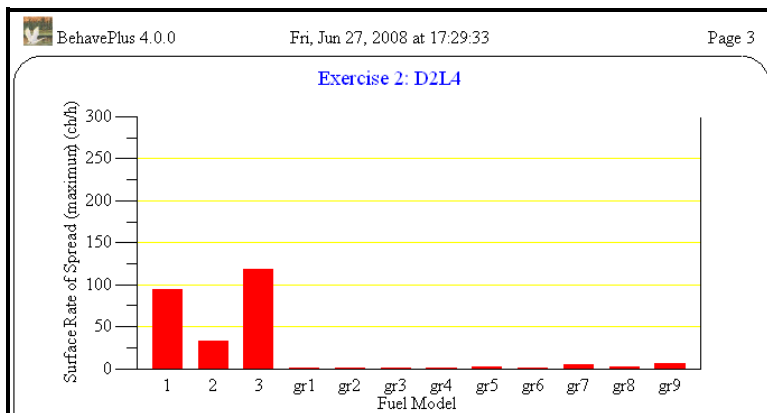
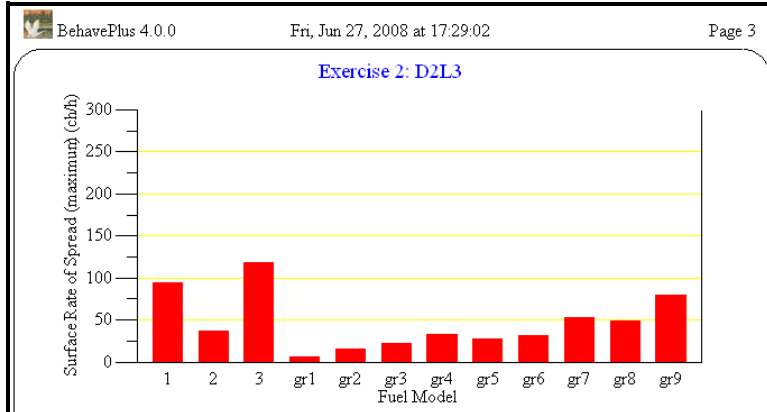
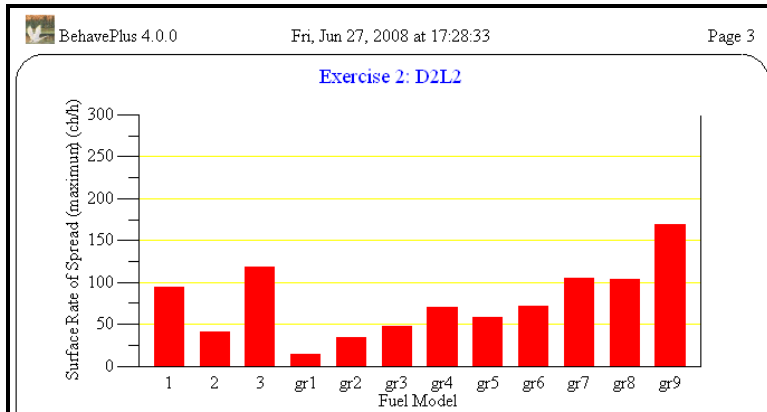
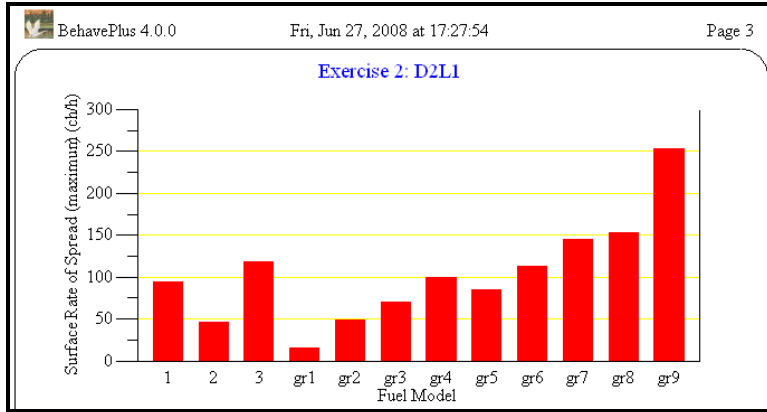
Then, fill in the chart appropriately.

Fuel Moisture, %	D2L1	D2L2	D2L3	D24
1-h	6	6	6	6
10-h	7	7	7	7
100-h	8	8	8	8
Live herbaceous	30	60	90	120
Live woody	60	90	120	150

As a reminder, the worksheet should look similar to the following:



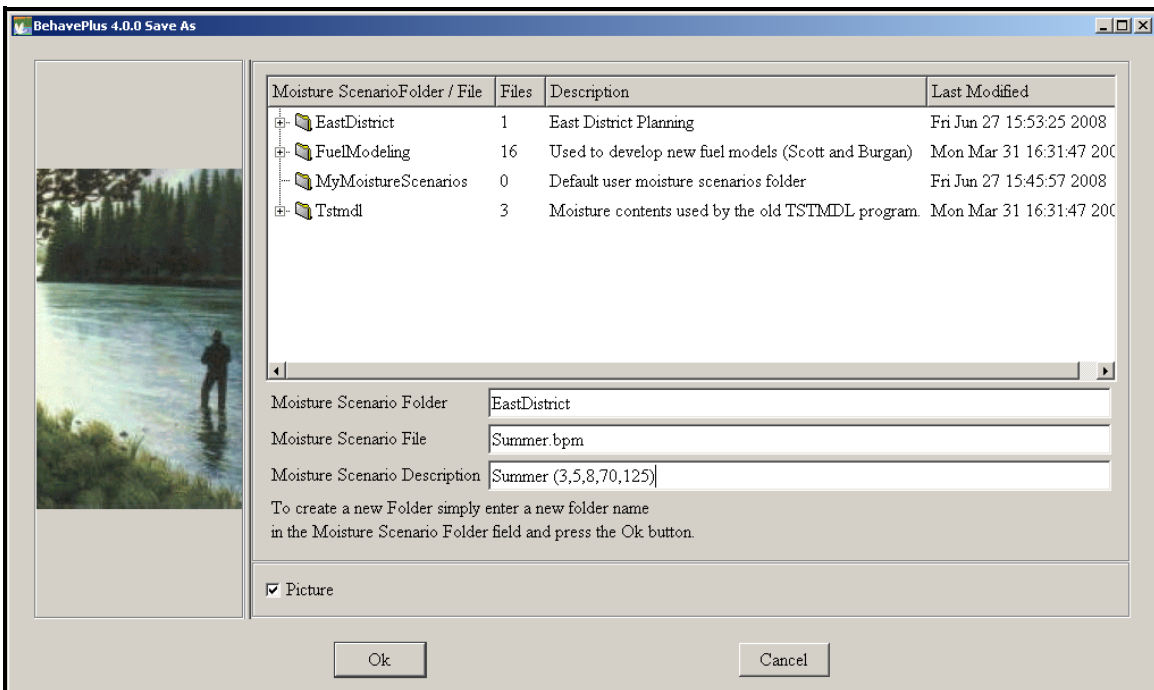
- Change the graph size so that four graphs can better fit on a single page.
- To do this, go to the **Configure > Appearance preferences > Graph Size** tab.
- Change the **Graph Size** to 35%.
- Do a separate run for each Moisture Scenario.
- When asked to specify the **Y Axis Maximum**, choose 300 ch/h. We don't need to worry about the **Y Axis Maximum** for Flame Length since we are not examining the effects of Moisture Scenario on this variable.



3. Create two more Moisture Scenarios for the EastDistrict folder. Use appropriate names and description.

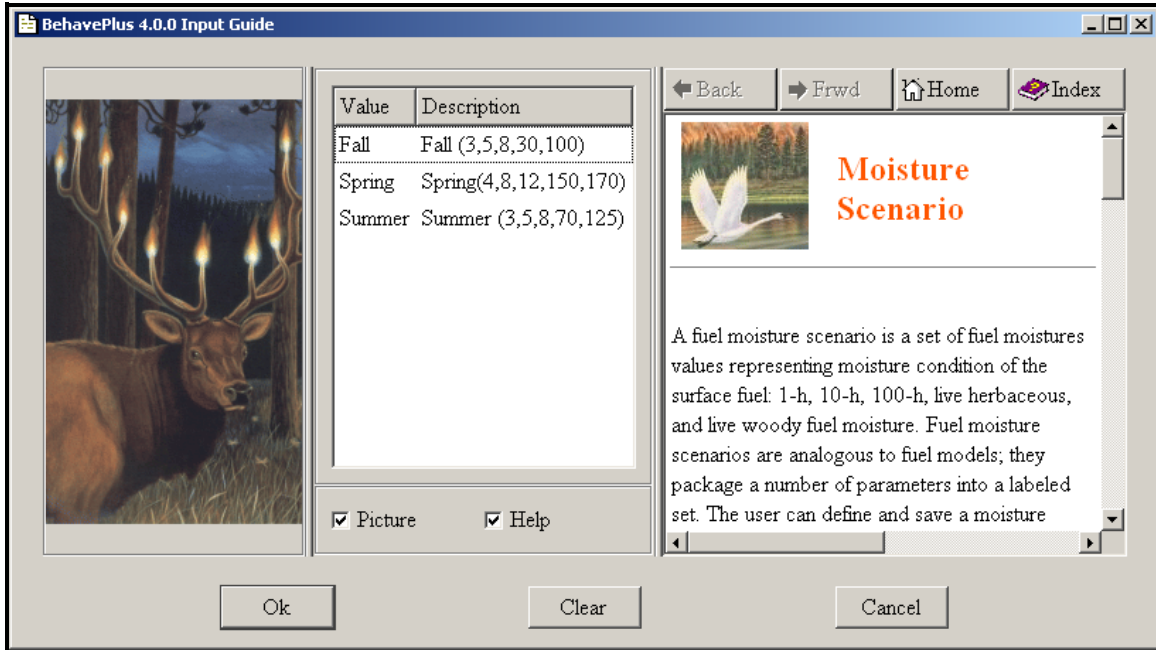
Fuel Moisture, %	Spring	Summer	Fall
1-h	4	3	3
10-h	8	5	5
100-h	12	8	8
Live herbaceous	150	70	30
Live woody	170	125	100

- Open the **BasicStart.bpw** worksheet.
- Enter the following inputs into the appropriate Fuel Moisture fields: “3, 5, 8, 70, 125”.
- Save this in the **EastDistrict** folder as **Summer.bpm** with the Description “Summer (3,5,8,70,125)”.



- Return to the worksheet and modify the Live Herbaceous and Live Woody fuel inputs to “30” and “100” respectively.
- Save this in the **East District** folder as **Fall.bpm** with the Description “Fall (3,5,8,30,100)”.
- Change the worksheet to input Moisture Scenario.
- Attach the **EastDistrict** Moisture Scenario folder by going to **Configure > Moisture scenario set selection** and selecting the folder entitled **EastDistrict**.
- Click **Ok**.

- Check that the three Moisture Scenarios created in this lesson are available.



- Quit the BehavePlus program and restart. Do a run that produces the following table using your new Moisture Scenarios. Use fuel model 2 and 30% slope.

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Exercise 4: East District
Flame Length (ft)

Moisture Scenario	Midflame Wind Speed (upslope)					
	mi/h					
	2.0	4.0	6.0	8.0	10.0	12.0
Spring	4.0	5.8	7.6	9.5	11.3	13.0
Summer	5.0	7.1	9.4	11.7	13.9	16.1
Fall	5.4	7.7	10.2	12.7	15.1	17.4

- Open **BasicStart.bpw**.
- Change to Moisture Scenarios.
- Change the output to only Flame Length.

- Enter values on the worksheet as shown.

BehavePlus 4.0.0 Page 1

Inputs: SURFACE

Description Exercise 4: East District

Fuel/Vegetation, Surface/Understory

Fuel Model 2

Fuel Moisture

Moisture Scenario Spring, Summer, Fall

Weather

Midflame Wind Speed (upslope) m/h 2.0, 4.0, 6.0, 8.0, 10.0, 12.0

Terrain

Slope Steepness % 30

If you select the Moisture Scenarios from the input list, they will be in alphabetical order rather than in the logical order of Spring, Summer, Fall. So, you should type them in the order that you want the table to be produced.

BehavePlus 4.0.0 Input Guide

Value	Description
Fall	Fall (3,5,8,30,100)
Spring	Spring(4,8,12,150,170)
Summer	Summer (3,5,8,70,125)

Moisture Scenario

A fuel moisture scenario is a set of fuel moistures

Fuel Moisture

Moisture Scenario Fall, Spring, Summer

- Calculate the run.

Question – Can you make a table like this using individual moisture values rather than Moisture Scenarios?

No, try it. This illustrates one benefit of using Moisture Scenarios.

Use the option of Moisture in entered by size class to calculate the values in the table above for the Fall moisture conditions.

- Delete Spring and Summer as input values from the Moisture Scenario input line.
- Change the input option to enter moisture as individual values.

Notice that the values for Fall are automatically inserted into the appropriate spots.

BehavePlus 4.0.0 Fri, Jun 27, 2008 at 17:48:00 Page 1

Inputs: SURFACE

Description ➤ Exercise 4: East District

Fuel/Vegetation, Surface/Understory

Fuel Model ➤ 2

Fuel Moisture

1-h Moisture % ➤ 3

10-h Moisture % ➤ 5

100-h Moisture % ➤ 8

Live Herbaceous Moisture % ➤ 30

Live Woody Moisture % ➤ 100

Weather

Midflame Wind Speed (upslope) mi/h ➤ 2.0, 4.0, 6.0, 8.0, 10.0, 12.0

Terrain

Slope Steepness % ➤ 30

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Exercise 4: East District

Midflame Wind Speed mi/h	Flame Length ft
2.0	5.4
4.0	7.7
6.0	10.2
8.0	12.7
10.0	15.1
12.0	17.4